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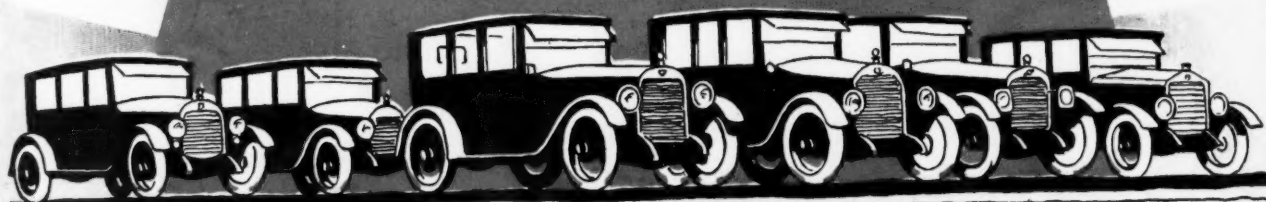
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NEW YORK—THURSDAY, MAY 5, 1921

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Taxes and Tariff Major Topics at U. S. Chamber Meeting

Largest business body is well under way on its newly found mission of interpreting business idea for guidance of government activities. Sales tax is not indorsed. Business-like solution of tariff problem.

By Clyde Jennings

MUCH headway was made by the Chamber of Commerce of the United States in its new program of serving as an intermediary between business and government at the ninth annual meeting at Atlantic City, held last week. Perhaps it would be better to say that the Chamber now hopes to interpret for Government the opinion of business as to how Government can best aid business. It was in keeping with this objective that the slogan of the meeting was:

**More Business in Government;
Less Government (management) in Business.**

Herbert Hoover suggested a third line to this slogan, which he stated something like this:

Better Government Assistance to Business.

This added phrase was much applauded, but it was evident from expressions made at other times during the meeting that the hope of the business man for more intelligent assistance to business from Government is based very largely in Secretary Hoover. Business men are frankly suspicious of other Government efforts to assist business, but they whole-heartedly approved of Secretary Hoover when he appeared before them, and of the pledges and views expressed in his talk to them in the general session held on Thursday evening.

The two big topics presented to the members of

the Chamber present at the Atlantic City meeting were:

**Taxes.
Tariff.**

The idea was to arouse an interest in these two topics from the business man's point of view, which is probably a very different thing than the political view. The Chamber, very frankly, was cautious in taking up these topics because they are so completely involved in politics. The big idea behind the proposal to interest the Chamber in these topics was to transfer them from politics to business. Apparently an intense interest was aroused in this new view of both topics.

On Thursday afternoon there was a separate meeting of each of the nine groups, in which the time was evenly divided between Taxes and Tariff, and an effort was made to obtain the sentiment of those present by a ballot on certain questions relating to the subjects. This idea was so new to the Chamber practice that the compiler of the questions failed to make them clear, and also the various chairmen of the groups did not understand the suggested practice. The result was that the ballots were not authoritative and were only mildly informative. The explanation appears to be that in turning so large a vehicle as the Chamber toward a new goal that there was considerable disarrangement of the internal machinery. At

the last general session of the Chamber, President Defrees apologized for the conduct of some of the group meetings.

The study of taxes became the intense problem of the meeting, chiefly because of the insistence of the sales tax proponents that this particular form of tax be indorsed by the Chamber. All through the general and group meetings the sales tax appeared to be highly popular with those present. Any mention of it was applauded, while a speech by R. G. Rhett, which was one of the most logical arguments made in the meetings and which was well presented, opposing this form of tax, was received in silence.

It was apparent throughout the meeting that the taxation policy advocated by the National Automobile Chamber of Commerce was the idea of many of those present. This is, briefly:

A cancellation of excise taxes and excess profits taxes and a lowering (at least) of income surtaxes.

The establishment of a sales tax, if governmental expenses cannot be reduced to a point where the taxes remaining will pay the bills.

This tax policy includes the belief that those governed should have much to say about how much money should be spent for different departments of the Government and how quickly war obligations should be paid. There was no question as to the popularity of this program with those present, but when the resolution on taxation was read by the Resolutions Committee it did not specifically support this plan. The sales tax proponents obtained recognition and urged the adoption of their resolution.

A compromise was effected by an apology for the way in which the tax question had been handled throughout the meeting and for the previous referendum by the Chamber. It was admitted that the questions in this referendum were so vague as not to give definite information. It was promised that, if the sales tax proponents would not force the issue on the floor, a new referendum would be taken as quickly as possible in the plainest possible terms. The objection to a vote at that time was that there was no way of determining what proportion of those present at the meeting were entitled to vote for their organization, and what proportion of actual delegates were still present.

New Tariff Plan

The tariff proposal, which was second in interest and regarded by many as first in importance, was handled quite differently. The subject was outlined in these three questions, which were submitted to the various groups:

1. Should the tariff be framed with due regard to export trade as well as to the protection of manufacturing in the United States?
2. Should the economic needs of foreign countries and the fact that we are now a creditor nation alter our tariff policy with respect to protection?
3. Should the United States tariff offer trading or bargaining possibilities for international commercial treaties to encourage our export trade?

The solution offered by the Tariff Committee of the Chamber was so different from any previous consideration of the tariff problem that it created much interest. Because it was so different, the Resolutions Committee decided not to indorse it at once, but to suggest continued study by the Chamber's committee. The Board of Directors accepted this report, which was described at some length by H. M. Swetland before the Civic Development Group. This explanation, in part, follows:

"Tariff legislation has so far presented its apology for

its interference in the right of any people to market their products in any country, either under the plea of raising funds for the government or the encouragement and protection of domestic industries. No doubt sufficient logic can be found for either argument to stimulate legislation, but in these days the production of \$300,000,000 from tariff duties is almost insignificant in our governmental departments and protection to our industries, with rare exceptions, is a reflection on the efficiency of our productive capacity as compared with the production of other countries.

"Then we must not lose sight of the further fundamental that any duty paid on any commodity increases the price of that commodity to the consumer, and this consumer, therefore, pays the \$300,000,000 revenue and also affords the protection demanded for production.

"Probably the greater necessity for tariff on imports lies in the protection afforded American labor. Unless we are willing that our living conditions of labor shall descend to the lowest level of foreign production, we shall need a protective tariff for many products. This will be most necessary on commodities requiring a large percentage of hand labor. This country can now compete in the markets of the world on commodities produced largely from automatic machinery and in large quantities. Gradually our industries, due to American inventive genius, will evolve into the sphere of greater and more economical production, lessening the necessity for protection and opening our products to the wider markets of the world.

"These fundamentals must be borne in mind in any consideration of any phase of tariff policy. For many generations this country has decided in favor of duties on imports. This decision has been largely sustained by a consideration of the living conditions of labor in this country as compared with other countries. In the activities of this meeting we must accept the tariff as an established fact and give our attention to certain fundamentals affecting this policy.

"**First Question:** Shall we frame our tariff with due regard to export trade as well as the protection of our industries? This is a simple problem in mathematics. Dr. Page, chairman of the Congressional Tariff Commission, will tell you that approximately 95 per cent of our manufactured products are consumed in this country.

"We will all readily concede that a low tariff will tend to increase our imports and to increase our exports, and that a high tariff will tend to decrease our foreign trade, both imports and exports. Having regard for export trade involves, therefore, a lower tariff rate, and the question becomes, will the increase in our 5 per cent export be balanced more or less by our imports affecting 95 per cent of our production?

"If we find our productive capacity lessened by the lower tariff, we have, then, also decreased our earnings, which, in turn, lessens our purchasing power. From this it seems clear that the determining factor is the ratio of our exports to our home consumption and that tariff should be formed with due regard to export trade.

"Illustrating these principles, we may observe the automotive industry, which, twenty-five years ago, was classed as an infant industry and has been developed under a protective tariff to one of our greatest lines of production. It has now reached the level of great quantity production and many large units are commanding trade from all parts of the world. The industry as a whole now appreciates the fact that a lower tariff is now necessary if foreign trade is to be extensively cultivated, and this industry has recently appealed through its Chamber of Commerce to have the import duty reduced nearly one-half.

"Second Question: The economic needs of foreign countries? The answer does not involve a philanthropic principle or motive, but requires the usual selfish business consideration. The argument is that these nations cannot buy from us unless they pay in goods.

"If we, as a creditor nation, sell to a debtor nation, they can only pay in goods, cash or credit. A greater extension of credit will increase the rate of exchange in which our price in their money becomes prohibitive. A two-thousand-dollar commodity in this country, sold in Germany under present exchange, would bring \$28,000, based on normal rates. They cannot buy for cash, as such procedure would quickly drain their treasury of gold. It remains that we must take commodities in exchange for our goods. If these commodities compete directly in our markets with our own production we will have reduced our production solely for the benefit of the debtor nation. Plainly this procedure would lack any economic value to us. Therefore any exceptional lowering of duties to the people of a debtor nation must be confined to such articles as are not in direct competition with the products of our own people.

"In Question Three we have opportunity to pacify to some extent the objection raised in Nos. One and Two. If we may bargain we may meet conditions. Bargaining forms the basis of all our commercial activities. If all our sales and purchases were based on predetermined inflexible prices not open to discussion and investigation of changing conditions our total activities would be greatly lessened. This principle applies with even greater force to interchange between nations.

"No reason exists why a need for our special productions in a foreign country should not be exchanged for a necessity from them on a fair basis. Valuations must, of course, be considered and tariff regulations equitably adjusted to a lower level by treaty between the two countries. The difficulty of working up lists of characteristic products from all countries and the confusion of collection of different rates on a particular commodity are urged as objections. But such lists are readily available and an advance in clerical intelligence in our ports of entry will not detract from the general efficiency. Such bargaining power would probably put an end to French discrimination against our products and the Latin-American rates against our canned goods. European countries have long made their customs the basis of commercial treaties.

"The retention of our present rigid regulations will constitute a continuing barrier to the full development of American commerce. The advent of the report of the Tariff Committee of the Chamber of Commerce of the United States, which has been injected into the group meetings for consideration by order of the Board of Directors since the program was printed, demonstrates the potential possibilities of the Chamber. The readiness with which the directors received the unanimous report of the committee and not only referred it to the various group meetings but also passed it to the committee on resolutions, marks the report as of unusual importance and proves the readiness of the Directors to act promptly on a matter that offers constructive development. The Committee foresaw the necessity for prompt and permanent tariff legislation. They realize the inadequacy of permanent tariff rates to meet the changing business conditions which must follow a reconstruction period such as afflicts our country at the present time.

"The Committee fully comprehended that every business interest in this country will be affected by the findings of Congress on tariff legislation. They recalled the many periods in the past when commercial interests of

the country have stagnantly awaited the final decree. They appreciated the progress made in recent years to give careful consideration of the nation's business by the establishment of the Congressional Tariff Commission. It is hoped that the business interests of the country may also be heard in an effort to assist in a constructive permanent tariff policy. To that end the committee has submitted the following report:

To the Board of Directors of the Chamber of Commerce of the United States:

Your Committee on Principles of Tariff Legislation report follows:

FIRST: It is recommended that permanent tariff legislation should be so framed as to permit adjustment of individual rates or particular schedules of rates within prescribed limitations, and authorize changes therein from time to time without a general revision of the tariff, and thus afford reasonable latitude in the application of tariff rates to any commodity, or group of commodities, in order that there may be flexibility in the adjustment of said rates to the varying fluctuations of industrial and trade conditions.

SECOND: It is recommended that such permanent tariff legislation should provide for and create a Tariff Adjustment Board, appointed by the President and confirmed by the Senate, with such emolument and tenure of office as will remove them from political influence and personal interest; that this Board shall be separate and distinct from the present Tariff Commission, the duties of which should be modified to require a report of its investigations to the Tariff Adjustment Board in addition to the reports it now makes.

THIRD: It is recommended that in framing such legislation the principles hereinafter stated should control and that it shall be the duty of Tariff Adjustment Board to apply the Tariff Acts of Congress and fix just and reasonable rates within said limitations to meet changing conditions, in accordance with said principles, viz:—

- (a) Promotion of the interest of the American Public as a whole.
- (b) Reasonable protection of American industries that are subject to destructive competition from abroad, and that are, or compromise to be, of benefit to the country as a whole, or to any considerable section thereof.
- (c) Maintenance and encouragement of export trade.
- (d) Meeting discriminations, direct or indirect, against the products of this country.
- (e) The prevention of dumping of foreign goods into this country to the injury of our markets.
- (f) Due consideration of the relative standards of living, earnings, and efficiency of labor in this and in other countries.

"In operation under the plan submitted by the Committee, Congress will pass a law levying duties on a list of commodities within certain limitations and the tariff board provided for in the report will determine the specific rate. This rate may be changed by the board as frequently as necessary to meet changing conditions. It can be modified to meet bargain conditions desirable to treaty agreements. Within the prescribed limitations it offers the flexibility necessary to extensive trading with other nations.

"To some extent this plan follows the working of the Interstate Commerce Commission. This body is authorized to determine a just and equitable charge for railway service. The tariff board will execute the new tariff law with fairness to the parties interested. Legislation will determine the basic policy as to high or low, as to protection, as to revenue, with specific limitations. The tariff board will specify rates.

"Beside elimination from Congress a most obnoxious opportunity for the lobbyist it dignifies our legislative activity and relegates the clerical labor of legislation to experts who devote themselves exclusively to this work.

Full opportunity for hearings will be given by Congress on questions of principle or policy and by the board on questions of specific adjustment.

"If this measure offers relief from stifling complication and tends to a more elastic and comprehensive adjustment of our tariff it must not be ignored from the fact that it offers a radical departure from present practice. If we are bound to make and unmake tariff rates as we always have by periodic tinkering, with its consequent depressing effect on all our industries, then Congress is the one department of our government lacking susceptibility to modern progress and evolution.

"We should concern ourselves however more particularly to the merits or demerits of this plan. Does it not at least contain the elements of an improved plan for the manipulation of one of our most serious and most complicated activities? If so, it is plainly our prerogative, and we may say our duty to give it most careful consideration, determine how it may be improved and then give it wholesome support."

There was one other tariff thought that was well received. This was a suggestion by Secretary Hoover that all imported articles should be valued on the American market standards, rather than on the point of origin. The speaker used the illustration that corn might be worth \$1 a bushel in this country, 80 cents in England, 50 cents in France and 30 cents in Japan, and when the bushels from the various countries were shipped into this country they would pay as duty 20 per cent of the value in their own country, rather than 20 per cent of the value of the corn with which they were to compete.

Of course there were other big thoughts in the meeting. Two of these were received with entire accord by all speakers, whether formal or impromptu. These were:

Stabilization of the entire world trade is necessary before trade in any country can reach a normal basis. Just now the indemnity problem and the status of Russia are the big factors.

That the successful organization of the Foreign Trade Financing Corporation is the hope of the export trade of this country.

The Wage Problem

There was a highly interesting and instructive session of the Fabricated Production Group devoted to the relation of wages to production and sales. Some very interesting charts were displayed by Magnus Alexander and others. The employers quickly seized upon these and statements were frequently made that it was going "to be necessary for employers to grasp the situation with a strong hand and adjust operating expenses."

But only one speaker in the discussion mentioned as important the methods of reducing wages. Clarence Howard, in the informal discussion, briefly advised employers that in all dealings with their employees The Golden Rule should be their guide. Howard made it plain that in his dealings, the feelings of the employee were more important to him than statistics: that statistics were of value only when they were understood by the employee as well as by the employer.

The Business Man's Creed

The new objective of the Chamber is very well stated in the preamble to the resolutions, which is described as the "basic philosophy of the American business man." This statement will probably do much to explain to the members who were frankly at a loss to understand the changed character of the meeting. The statement follows:

This chamber believes that the relation of government toward industry and commerce is primarily that of preserving equality of opportunity. Laws and administrative acts should touch business enterprise with great care and only to preserve a fair field to all.

A wholesome standard of living is essential to general contentment. That standard depends upon the intelligence, work and thrift of the individual citizen. Hence, restriction of production must necessarily undermine that standard. We therefore condemn avoidable strikes, lock-outs and all combinations that needlessly limit output or curtail distribution on the part of workers, owners or managers of industry.

The foundation of all enterprise is primarily that of service to the community, and this service is most effective under private initiative. The community's variation of that service, and its reward for it, are most fairly expressed when secured by individual initiative, under conditions of free competition. The value of and the reward for such service cannot be safely apportioned by the arbitrary decisions of government agencies.

An Automotive Director

Automotive interests fared exceedingly well in this meeting. A. J. Brousseau of the International Motor Co. was elected a director to represent the Fabricated Production group. The highway resolution favored by the automotive industry was adopted by the meeting. The industry strongly favored a resolution for the sales tax, but was well satisfied with the decision of the Chamber to have a new referendum on this question. The automotive speakers were well placed. C. C. Hanch, chairman of the N. A. C. C. taxation committee, spoke before the Foreign Commerce Group on this subject; C. A. Vane of the National Automobile Dealers' Association spoke on the same subject before the Civic Development Group, and J. Walter Drake, chairman of the N. A. C. C. Export Committee, spoke before the Fabricated Production Group on Tariff. This is more recognition than this industry has previously been accorded and there was a very strong feeling that the automotive industry would soon come into its proper station as the second greatest industry in the country.

An aeronautical resolution, which was submitted to the Resolutions Committee, was referred for further study.

The New S. A. E. Handbook

THE Society of Automotive Engineers has recently sent copies of the revised edition of Volume I of the S.A.E. Handbook to all of its members. Although the data contained in the revised edition are in general the same as those in the old edition, some new matter has been added, as for instance, complete physical characteristics of S.A.E. Steels, the report of the Nomenclature Division on automobile nomenclature and the report of the Research Division on passenger car performance tests.

The S.A.E. Standards and Recommended Practices consist of material, dimensional and test specifications, terminology, rules for procedure in the maintenance of parts, and provisions as to various closely related matters, which, according to the consensus of opinion of qualified experts, can be generally adopted with great advantage, and in no way interfere with or impede progress in the design and production of automotive apparatus and power units included in the field of activities of the Society.

The S.A.E. Standards and Recommended Practices have made possible economies in designing, in purchasing, in production and in maintenance, and relieved automotive engineers of much detail and routine work, permitting them to concentrate upon the more important engineering problems.

Commercial and Engineering Standards Discussed at Gear Makers' Convention

Several recommended practices are adopted. Cost accounting methods receive further consideration. Work on gear standardization proceeding. A standard form of gear tooth which can be made by several methods is proposed. Universal roller chain sprocket now under way.

By P. M. Heldt

AN important outcome of the fifth annual convention of the American Gear Manufacturers Association, held at Cincinnati April 27-30, may be the development of a standard tooth for spur gears which can be cut by any of the well-known methods, thus making interchangeable the gears produced by rotating form cutters, gear planers and gear hobbers. What led to the suggestion of the development of such a tooth form was the recommendation, contained in the report of the Spur Gear Committee, that the $14\frac{1}{2}$ deg. involute tooth, as commonly used in the interchangeable system embracing 12 teeth to a rack, be adopted as standard for industrial gearing. It was the intention to make this a so-called adopted standard, and if it had been accepted it would no doubt have been proposed to the American Engineering Standards Committee as an American standard. The objection was raised by E. W. Miller of the Fellows Gear Shaper Co., that in order to make this form of tooth a standard, it would be necessary to closely define its form, and this the recommendation failed to do. He further objected that the $14\frac{1}{2}$ deg. tooth as commonly used in the interchangeable system was not a true involute shape and that the description "the $14\frac{1}{2}$ deg. involute tooth" therefore was really incorrect. Mr. Miller, moreover, made the point that there was a strong tendency away from this tooth form, and that it was not a good plan to standardize anything the stability of which was uncertain, as once a thing has become a standard it is a difficult matter to recall it. Mr. Miller did not object to the adoption of the $14\frac{1}{2}$ deg. involute tooth as commonly used in the interchangeable system as recommended practice, and the recommendation was passed by a rising vote, but as the vote was not nearly unanimous the matter was referred back to the committee for further consideration.

In the course of the discussion Mr. Miller made the remark that it was quite possible to find a form of tooth that could be cut by any of the commonly used methods of gear cutting, the rotary cutter, the gear shaper and the gear hob, and he was not sure but that this tooth form was superior to any of those now in use. This statement aroused a great deal of interest among the members, all of them practical gear cutters. One member made the statement that it would be of little advantage to the gear cutting industry if the milled tooth, the planed tooth and the hobbled tooth had to be standardized separately, as these different types were already interchangeable among themselves, and the standardization work would not really advance the industry, but if pinions and gears made by all methods could be made interchangeable it would be of distinct advantage to the gear industry. No definite action was taken on the suggestion, but as the recommendation regarding spur gear tooth

form was referred back to the committee it is to be presumed that it will be taken up at the next committee meeting, which is to be held in Buffalo within a month.

The meeting was held at the Sinton Hotel and was well attended. It was opened by the usual address of welcome and by President Sinram's address. The secretary's report showed that the association now has a membership of 90 companies, represented by 109 executive and 55 associate members, making a total of 164 individual members. The Baush Machine Tool Co. of Springfield, Mass., was elected to membership in the course of the meeting. An invitation was extended to the membership to attend the forthcoming meeting of the National Manufacturers Association, to be held at the Waldorf-Astoria Hotel, New York, May 16-18. J. B. Doan, president of the American Tool Works and also president of the local section of the Metal Trades Association, made an address in which he covered some phases of the machinists' strike in Cincinnati last year.

Roller Chain Transmission

During the afternoon session of the first day, April 27, G. M. Bartlett, chief engineer of the Diamond Chain & Manufacturing Co., read a paper on the Ideal Chain and Sprocket Drive. Mr. Bartlett explained that transmission by link chains is a relatively new development and is still in its infancy. It was first used extensively for bicycles, and later the development of the passenger car and motor truck gave it a great impetus in the direction of the transmission of increased powers. The design of sprockets for the chains to run on is complicated by the requirement that the sprocket must fit the chain when it is worn, and the pitch is consequently lengthened, as well as when the chain is new. Wear of the chain has been allowed for in the past by enlarging the spaces between sprocket teeth, with the result that only one roller of the chain is in contact with a tooth at a time. In a new form of sprocket tooth which is now being evolved by a joint standardization committee of the A. G. M. A., the Society of Automotive Engineers and the American Society of Mechanical Engineers, this difficulty is overcome, as the chain rollers of both new and worn chains can be in contact with a number of sprocket teeth at a time and the tendency of the sprocket teeth to wear hook-shaped is eliminated, contact of the rollers of a worn chain occurring further out on the teeth of the sprocket. Mr. Bartlett's paper was illustrated with lantern slides, and we expect to publish extensive extracts of it in a future issue.

Erik Oberg, editor of *Machinery*, brought to the convention a message from Secretary of Commerce Hoover. At a recent conference with business paper editors, Secretary Hoover announced his intention to make the depart-

ment a department of domestic as well as of foreign commerce, and to this end he desires the co-operation of the various branches of industry. The machine-tool industry, to which the message had been presented on a previous occasion, were of opinion that they could easily gather statistics of their own production themselves but that they would like the department to give increased attention to the gathering of statistics of the fundamental industries, such as the steel industry.

J. H. Dunn, chairman, made the report of the Uniform Cost Accounting Committee. He told the members that the object of this committee was to show them how unreasonable cut-throat competition could be eliminated by intelligent costing. There are now more than a hundred cost committees of industrial organizations in existence. It is generally recognized now that the manufacturers themselves will have to solve their own cost problems, as hundreds of thousands of dollars have been wasted by the employment of cost experts or efficiency experts. The National Lime Association has had a uniform cost accounting system in use for two years and figures that it has saved the members a million dollars already. Mr. Dunn laid emphasis on the fact that if the members of the Association should use a uniform cost accounting system they would not necessarily have all the same costs, as the overhead charges and the equipment of the different factories were different. At a previous meeting the Association adopted a uniform cost accounting system, but this was considered too complicated and cumbersome for the smaller concerns to put into use, and to meet this criticism the committee had prepared an abbreviated form in which several items in the longer form were combined under one head. In connection with its report the committee also presented some illustrations of how costs on gear jobs work out by the "direct labor cost," the "machine-hour overhead rate" and the "overhead prorated against direct labor cost" methods.

Mr. Wilson brought up the question whether it was right to let the production carry the entire overhead charges under such abnormal conditions as we are experiencing now. He did not think it was fair to charge the entire overhead if that suddenly jumped ahead 300 per cent or more, and suggested that the normal rate of overhead should be charged and the rest be absorbed in a special account. This would prevent the cost from suddenly increasing to abnormal values; and, moreover, the department did not become confused in preparing estimates.

Method of Apportioning Selling Cost

Another question that was discussed at some length was whether selling costs should be apportioned on the basis of manufacturing costs or on the basis of selling price. One speaker reasoned against the latter method in the following terms: Suppose your selling department secures one order at a profit of 10 per cent and another at a profit of 60 per cent; would it be fair to charge them with extra cost for getting the more profitable business? Upon motion of Mr. Kebler the report of the Committee on Uniform Cost Accounting was adopted, with the recommendation that the members be urged to put the system into use.

At the session on Thursday morning, April 28, F. B. Waterman, chairman of the General Standardization Committee, made a report for the A. G. M. A. Sectional Committee of the American Engineering Standards Committee and also a report for the General Standardization Committee. In the latter he mentioned the fact that five subcommittees would make reports containing suggestions for recommended practices and two would report progress.

The first subcommittee report was that on spur gearing and was presented by the chairman, F. E. Eberhardt. All recommendations related to industrial gearing and

therefore do not concern the automotive industry directly. It was proposed to standardize the $14\frac{1}{2}$ deg. involute interchangeable system, and proportions for the tooth elements were given. It was also proposed to standardize 20 deg. stub teeth for use where great strength or small numbers of teeth are required, and proportions for this form of teeth were also given. Rules were also given for the width of face, thickness of rim for spoked gears and diameter of hub. After prolonged discussion, as outlined in the first part of this article, the report with amendments was adopted by a majority vote, but was referred back to the committee for further consideration. One point that came up in the discussion was whether there was any necessity for standardizing 20 deg. pressure angle teeth for industrial gearing. In this connection J. B. Foote of the Foote Bros. Gear Co. made the statement that in the experience of his firm from 15 to 20 per cent of the orders for industrial gearing call for 20 deg. pressure angle teeth and the tractor industry uses such teeth exclusively. It was also brought out in the discussion that with the gear planing method it is necessary to provide a slightly larger clearance than is customary with gears formed with rotary cutters. John Christensen suggested that for large gears there should be certain standard numbers of teeth, so that more extensive use could be made of stock patterns.

Bevel Gear Recommended Practice

F. E. McMullen, chairman of the Bevel and Spiral Bevel Gear Committee, made a report for that committee which was adopted as presented. This report contains diagrams and tables for use in determining the dimensions of tooth elements and explains how the tabular values are arrived at. The report follows:

"Bevel gear teeth are treated in the same manner as spur gear teeth with the exception that the back cone radii (Fig. 1) are used instead of the pitch radii of spur gears. In Fig. 2, the pitch circles of a gear and pinion are drawn together with the base circle of the pinion determined by the pressure angle "a." Involute tooth contact cannot take place below the base circle, since the involute curve has its inception at the base circle, and any projection of the gear or pinion addendum beyond the base circle of the pinion at the beginning and end of the theoretical arc of action is useless in so far as tooth action is concerned.

"The problem is first to find the gear addendum which at the beginning of the arc of approach extends to the base circle of the pinion, labeled in Fig. 2, Maximum Theoretical Addendum. The values in Table I are obtained on this basis by solving the oblique angled triangle for various ratios and pressure angles. Examination of this table will show that the tabular values between ratios 3-1 and 8-1 do not change greatly, and for the sake of simplicity, we have assumed that there is no change in preparing the bevel gear tooth proportion tables.

TABLE I
Maximum Theoretical Addendum of Bevel Gear Pinion
Back Cone Radius = 1 in.

Ratio	14½ Deg.		20 Deg.		14½ Deg.		20 Deg.	
	In.	In.	In.	In.	Spiral In.	Spiral In.	Spiral In.	Spiral In.
1-1	0.0899	0.1623	0.1159	0.2043				
2-1	0.0699	0.1295	0.0909	0.1655				
3-1	0.0659	0.1226	0.0859	0.1571				
4-1	0.0645	0.1201	0.0841	0.1541				
5-1	0.0638	0.1190	0.0832	0.1527				
6-1	0.0635	0.1184	0.0828	0.1519				
7-1	0.0632	0.1180	0.0825	0.1514				
8-1	0.0631	0.1177	0.0823	0.1511				

"A percentage has been added to the theoretical values, the purpose of which is to provide an ease-off. Reference to Fig. 3 will show graphically that unless this percentage is added, the tooth load on the gear at the beginning of approach will lie along the very top edge of the tooth, a condition to be avoided.

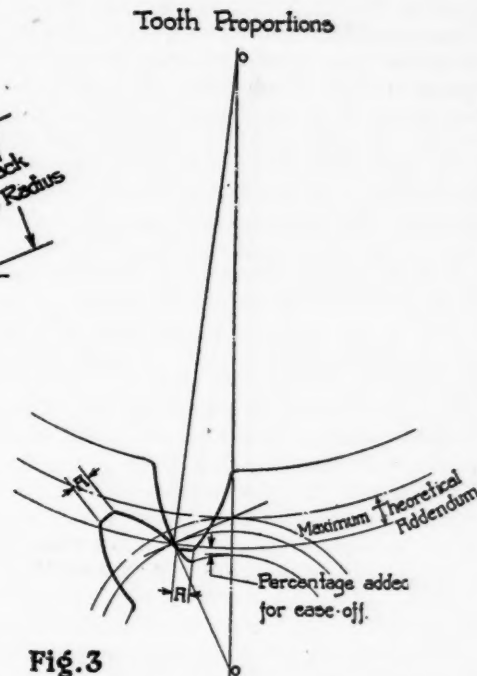
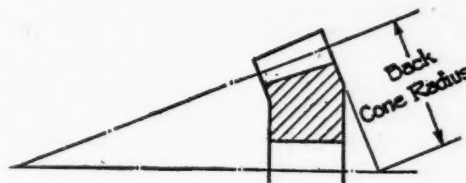
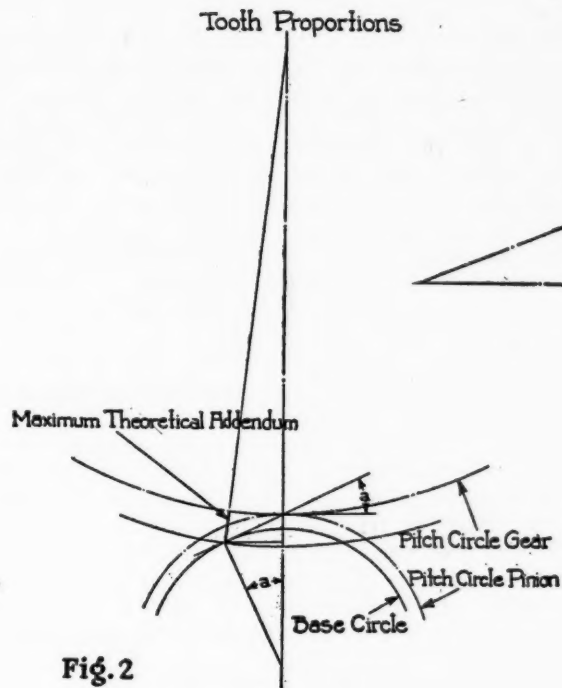
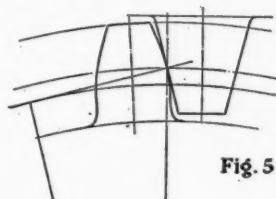
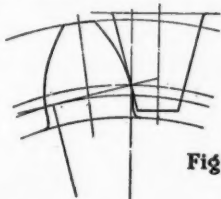


TABLE 2
Straight Bevel Gear Tooth Proportions
Pressure Angle, $14\frac{1}{2}$ Deg. Ratio 3-1 to 8-1.
Tabular values are for 1 d.p. For any other pitch divide by diametral pitch used.

No. of Teeth in Pinion	Addendum		Full Depth	Circular Thickness	
	Gear In.	Pinion In.		Gear In.	Pinion In.
14	0.560	1.440	2.157	1.186	1.955
15	0.600	1.400	2.157	1.221	1.920
16	0.640	1.360	2.157	1.256	1.885
17	0.680	1.320	2.157	1.291	1.850
18	0.720	1.280	2.157	1.326	1.815
19	0.760	1.240	2.157	1.361	1.780
20	0.800	1.200	2.157	1.396	1.745
21	0.840	1.160	2.157	1.431	1.710
22	0.880	1.120	2.157	1.466	1.675
23	0.920	1.080	2.157	1.501	1.640
24	0.960	1.040	2.157	1.536	1.605
25	1.000	1.000	2.157	1.571	1.570

TABLE 3
Spiral Bevel Gear Tooth Proportions
Pressure Angle $14\frac{1}{2}$ Deg. Ratio 3-1 to 8-1.
Tabular values are for 1 d.p. For any other pitch divide by diametral pitch used.

No. of Teeth in Pinion	Addendum		Dedendum		Full Depth	Circular Thickness	
	Gear In.	Pinion In.	Gear In.	Pinion In.		Gear In.	Pinion In.
10	0.500	1.200	1.420	0.720	1.920	1.2000	1.9416
11	0.550	1.150	1.370	0.770	1.920	1.2500	1.8916
12	0.600	1.100	1.320	0.820	1.920	1.3000	1.8416
13	0.650	1.050	1.270	0.870	1.920	1.3500	1.7916
14	0.700	1.000	1.220	0.920	1.920	1.4000	1.7416
15	0.750	0.950	1.170	0.970	1.920	1.4500	1.6916
16	0.800	0.900	1.120	1.020	1.920	1.5000	1.6416
or over	0.850	0.850	1.070	1.070	1.920	1.5500	1.5946



(See Fig. 4)

14-Tooth Pinion, Straight Bevel, 3-1 Ratio or Greater

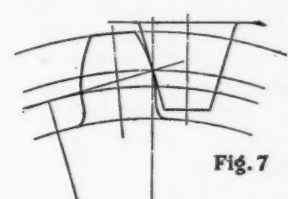
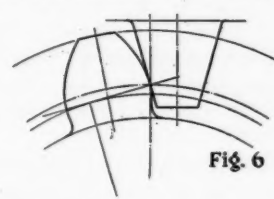
	Gear In.	Pinion In.
Pitch depth	0.560	1.440
Full depth	2.157	2.157
Circular thickness	1.186	1.955

Pressure angle, $14\frac{1}{2}$ deg.

(See Fig. 5)

25-Tooth Pinion, Straight Bevel, 3-1 Ratio or Greater

	Gear In.	Pinion In.
Pitch depth	1.000	1.000
Full depth	2.157	2.157
Circular thickness	1.571	1.570

Pressure angle, $14\frac{1}{2}$ deg.

(See Fig. 6)

10-Tooth Pinion, Spiral Bevel, 3-1 Ratio or Greater

	Gear In.	Pinion In.
Pitch depth	0.5000	1.2000
Full depth	1.9200	1.9200
Circular thickness	1.2000	1.9416

Pressure angle, $14\frac{1}{2}$ deg.

(See Fig. 7)

17-Tooth Pinion, Spiral Bevel, 3-1 Ratio or Greater

	Gear In.	Pinion In.
Pitch depth	0.8500	0.8500
Full depth	1.9200	1.9200
Circular thickness	1.5500	1.5946

Pressure angle, $14\frac{1}{2}$ deg.

"The shapes of the teeth specified in Table 2, of $14\frac{1}{2}$ deg. straight tooth gear proportions, are shown in Figs. 4 and 5. The circular thicknesses given in the table were obtained from these layouts by giving consideration not only to strength but also to the width of the top land, and insure a width sufficient to prevent a complete carbonization and consequent brittleness in case hardening.

"The values given in the tables are for 1 d.p. throughout. For any other pitch, it is necessary to divide the tabular values by the given diametral pitch. No table is offered for the 20 deg. pressure angle, straight tooth gears, as the standard proportion where the addendum is one-half of the working depth has proved satisfactory where the number of teeth is not less than 12.

"For ratios below 3-1, either additional tables will be required or a formula offered to provide individual treatment of each case. The reason for this is apparent from a study of Table 1, where it will be noted that the tabular values change greatly among the lower ratios; in fact, the percentage change is so great that at least four tables will be required to properly cover the ratios from 1-1 to 3-1 for each pressure angle.

Spiral Bevel Gears

"Table 3 gives the tooth proportion for $14\frac{1}{2}$ deg. spiral bevel gears for ratios between 3-1 and 8-1. The values are

obtained in the same manner as for straight tooth gears with two modifications. The working depth of spiral bevels is 85 per cent of that of straight tooth gears or standard depth for the normal pitch and the bottom clearance is $0.07 \times$ the C. P. instead of the usual standard of $0.05 \times$ the C. P. Figs. 6 and 7 show the tooth shapes of teeth based on the proportions given in Table 3.

Members and guests lunched together on Thursday and after lunch listened to an address by Senator George Wilder Cartwright from California, a member of the Senate's Industrial Relations Committee, on The Price of Success in America. During the afternoon members and guests took part in an automobile ride through the city of Cincinnati and surroundings, visits being made to the plants of the local members and to a number of machine tool plants. The cars for the occasion were furnished by the Cincinnati members and friends in the machine tool line.

On Thursday evening there was a meeting of the Cincinnati Section of the American Society of Mechanical Engineers, and as the two papers to be presented had to do with the subject of gear cutting, an invitation to attend has been extended to all delegates to the A. G. M. A. convention. O. B. Zimmerman, chief engineer of Gould & Eberhard, read a paper on Modern Methods of Gear Cutting, and Earle Buckingham, a paper on the Maag system of gearing. Practically all of the technical men at the gear convention attended the meeting, and some of them took part in the discussion.

Disagreement on Herringbone Gears

At the Friday morning session of the A. G. M. A., J. B. Foote presented the report of the Labor Committee, of which he is chairman. This was accepted as presented. A. F. Cooke presented the report of the Herringbone Gear Committee and asked that the report be referred back to the committee, as a disagreement had arisen between members thereof. The report recommended the use of diametral pitch hobs up to and including $1\frac{1}{4}$ in. diametral pitch, of a 20 deg. pressure angle measured on the axial section of the hob, of a $22\frac{1}{2}$ deg. spiral angle of short teeth with $0.8/d.p.$ addendum and $1/d.p.$ dedendum and of a minimum width of active face of $16/d.p.$ The width and depth of groove in the center of the blank was given in the form of a table for gears cut with hobs at right angles to the axis of the gear, and in the form of formulæ for gears cut with planing or shaping tools. A table was also given of the angles to which the hobs should be set, a table of enlargements for pinions and a chart of strength of herringbone gears. A. A. Ross, a member of the committee, said that they were anxious to get the views of the members regarding the selection of $22\frac{1}{2}$ deg. for the spiral angle. Although, in an effort "to get something accomplished," a motion was made by a member not connected with the committee that the report be adopted as read, on the protestation of another member of the committee that not even the committee members were agreed, it was voted to return the report to the committee for further consideration.

E. J. Frost, chairman, made a report for the Inspection Standardization Committee. This covers the same points as the report printed in the March 17 issue of AUTOMOTIVE INDUSTRIES, but the recommendations on some of these points were changed somewhat. Thus in connection with cylindrical holes it was recommended that cylindrical holes up to 3 in. in diameter should be inspected with "will and will not go" plug gages, the "will go" end to be the same as the smaller limit and the "will not go" end the larger limit given on the customer's drawing. Holes between 3 and 12 in. in diameter, bar gages should be used, in which there are two bars approximately at right angles to each other, held together by a handle pressed into a hole in

the middle of each bar; one bar being the "will go" and the other the "will not go," the nature of the piece being inspected, principally the length through the bore determining the length of the handle, and whether the bars shall be close together, or at opposite ends. Larger holes than 12 in. in diameter should be inspected with measuring rods, or inside micrometers set to vernier calipers, or standard measuring machine. No wear should be allowed on gages beyond the limits on customer's drawings.

It was recommended that in case of disputes concerning matters having to do with inspection an arbitration committee of three should be appointed—one by the buyer, one by the seller and they to appoint the third member. The report of the committee was accepted as presented, with a number of changes over the printed text as indicated by Mr. Frost.

The next business to come up before the meeting was an amendment to the constitution whereby the number of members of the Executive Committee was to be increased from 8 to 12. It was explained that when the Constitution was adopted the Association had only the nine charter members, while now the membership had grown to more than ninety. The amendment was adopted unanimously and the convention then proceeded to the election of the new members of the Executive Committee. J. H. Dunn, John Christensen and C. R. Weiss were appointed tellers. The following twelve were elected members of the Committee: F. W. Sinram, E. J. Frost, Wm. Ganschow, J. B. Foot, C. E. Crofoot, Geo. L. Markland, Jr., R. P. Johnson, W. H. Diefendorf, Henry E. Eberhard, A. F. Cooke, F. D. Hamlin and B. F. Waterman.

At the same time that the number of executive committee members was increased it was decided to increase the number of vice presidents from one to two. Under the constitution of the Association the members of the executive committee elect the officers of the organization. F. W. Sinram was re-elected president, R. P. Johnson of the Warner Gear Co., Muncie, Ind., first vice-president, B. F. Waterman, second vice-president, and Frank D. Hamlin was re-elected secretary and treasurer. It was hinted that Mr. Johnson would act as an understudy to President Sinram during the year and would succeed him at the next annual meeting. Vice-president H. E. Eberhard, who was retired at his own request, was given a vote of thanks by the convention for his four years' services.

Next Meeting at Rochester, N. Y.

It was announced that an urgent invitation had been received from St. Louis to hold the next semi-annual convention in that city. The association, however, had already decided previously to meet in Rochester, N. Y., where they had been invited by officials of the Gleason Works. Under the heading of new business a motion was made that the association reduce its number of meetings from two to one per year. In support of the suggested change it was stated that it would work in the interest of economy, and also that, while the holding of two meetings per year might have been advisable when the association was young and had all of its work before it, much had been accomplished since then and it was no longer necessary to meet so frequently. The sponsor of the motion favored the fall meeting if his plan should be adopted. Another member was in favor of the spring meeting, for the reason that the committees could do much better work during the winter than during the summer, and therefore would be in better position to go before the Association with their reports in the spring than in the fall. Quite a number of members, however, voiced the opinion that interest in the work of the Association would flag if the frequency of meetings were reduced and it was voted to continue both meetings.

J. C. O'Brien, chairman of the committee on worms, worm gears and spirals, had been sick for some time and was not at the convention. In his absence W. H. Phillips gave a review of the state of the work of that committee. Ralph L. Dodge presented the report of the gear steels committee of which he is chairman. This report contained specifications of a series of steels recommended for gears. These are generally identical with the S. A. E. steels and are designated by the S. A. E. numbers. A No. 1100 steel had been in contemplation by the S. A. E. Iron and Steel Committee but was finally dropped. This steel therefore was also dropped from the A. G. M. A. list. It was suggested to issue two specifications which are intermediate between S. A. E. specifications, the A. G. M. A. 2350 and the A. G. M. A. 6150. Both of these have a carbon content of 0.45-0.55 per cent. Mr. Diefendorf wanted the S. A. E. No. 2320 included in the list, as it was widely used in gear manufacture, but he met with no support. E. J. Frost thought that a range of 10 points in the carbon content was entirely too great and expressed the view that steels at the extreme ends of the specification could not be properly heat treated at the same temperatures. In his plant they tested all steel for carbon content and never let bars with that wide difference go through. Mr. Dodge admitted that the range was rather wide for high carbon steel but said he did not consider it too wide for low carbon steel. That part of the report relating to the steel specifications was adopted as presented.

Standard Sprocket Tooth Under Development

C. B. Hamilton presented a progress report for the Hardening and Heat-Treating Committee dealing chiefly with the composition of gear bronzes. It had been proposed to change the name of this committee to Metallurgical Committee, and this proposal was adopted. A progress report of the Sprocket Wheel Committee was presented by C. R. Weiss, chairman. This committee is cooperating with corresponding committees of the S. A. E. and the A. S. M. E. Shortly after the fall meeting of the Association a meeting of roller chain manufacturers was held at the Engineers Club, New York, at which the new U. S. sprocket tooth form was agreed upon. This tooth form is still to be ratified by the S. A. E. and the A. S. M. E., and it is expected that it will be ratified at the spring meetings of these societies. Standard sizes of roller chain have already been adopted by the S. A. E. and will most likely be adopted also by the A. S. M. E. at its spring meeting. As soon as this is done the Sprocket Wheel Committee of the A. G. M. A. will be in position to issue information concerning standard chain sizes, details of cutters for standard sprockets and diameters for sprocket wheels. Two new members have been added to the committee recently, George M. Bartlett of the Diamond Chain & Mfg. Co. and Stanley P. Rockwell of the Whitney Mfg. Co.

The report of the Keyway Committee contained recommendations for the depth and width of keyways in shafts, the width to be made one-quarter the diameter of the shaft and the depth one-half the width. To avoid the need for carrying a very large number of sizes of key stock a table was incorporated in the report giving the sizes of keystock recommended for shafts from $\frac{3}{8}$ to 12 in. in diameter, inclusive. All sizes of key stock are square. For taper keys a taper of $\frac{1}{8}$ in. in a foot was recommended, which is very close to the British standard taper for keys, 1:100. The report also contained the S. A. E. square, spline and taper fittings.

B. F. Waterman thought that in the larger sizes the keys should be of rectangular instead of square section, of smaller depth than width. He said that many gear manufacturers had issued catalogues containing rules for width and depth of keyways, and suggested that all mem-

bers having such keyway tables send a copy of same to the Keyway Committee. C. B. Hamilton, Jr., thought the table contained too many sizes of keys and suggested that some be eliminated. One member objected to the limits of 0.001 in. on the broached holes of the S. A. E. fittings. The report was referred back to the Committee.

John Christensen reported for the Committee on Composition Gearing. This Committee has completed its standardization work except as regards the strength of composition gears, and in this connection arrangements have been made with the Engineering Department of Purdue University whereby the latter will conduct a series of tests on such gears.

A banquet took place at the Sinton Hotel on Friday evening, the speakers being Edward S. Jordan, president of the Jordan Motor Car Co., and Charles Woodward, vice-president in charge of personnel of the Hydraulic Steel Co. Mr. Jordan's subject was "Looking Ahead." He said few automobile companies are producing one-half as many cars as last year. During the past six months only 191,000 cars were built, as compared with 900,000 during the same period a year earlier. He was convinced that the present flurry would last only for a short time and that people generally would not pay the present prices. The man who expected to liquidate his inventory at the old prices would eventually discover that his overhead will net him as large a loss as if he took the loss on the inventory now. Mr. Jordan said there was a great upheaval going on in the automobile industry right now and many men were changing places, but he did not look for any consolidations.

Mr. Woodward spoke on the Human Element in Business. He dwelt upon the futility of the doctrine of the equal distribution of wealth and emphasized the great economic wastage due to the difference between what men can do and what they will do. If the difference be placed at 25 per cent of the former value, the wastage amounts to five billion dollars a year. Referring to the experiences of his own company, Mr. Woodward said, "Confidence is one of the big things you want to build in your workmen. One of the greatest troubles of our present system is that the superintendent insists on doing the thinking for his men, and until this condition is remedied no real progress can be made in the solution of the problems confronting capital and labor."

Loose Leaf Gear Handbook

At the final session on Saturday morning the report of the Library Committee was presented, by B. F. Waterman in the absence of chairman E. W. Baxter. This committee has in hand the preparatory work on a handbook on gearing which is to contain much of the so-called "useful information" that has heretofore been published in the catalogues of the individual members. A scrap book containing much of the material to be included in this handbook was shown. The question whether the volume should be in the form of a loose leaf book or a bound book was again taken up, and it was decided that a loose leaf book would best meet the requirements. The Metallurgical Committee, among others, expects to have valuable data from time to time which it will be possible to incorporate quickly in the hand book if it is of the loose leaf form. It would probably take years to get all the material for the complete handbook together, while a start could be made on a loose leaf handbook in the near future.

During this session two papers were presented, one by A. R. Mitchell of the Andrews Steel Co. on Industrial Gears from the Users Standpoint, and the other by J. B. Foote of the Foote Bros. Gear Co. on Worm Gearing. We expect to print extracts from Mr. Foote's paper in a later issue of AUTOMOTIVE INDUSTRIES.

One Example of British Light Car Practice

The Standard, one of the early designs of light car produced in England is typical of one class of vehicle which has become very popular there. Has high speed 10 hp. engine, 108 in. wheelbase and 48 in. tread and weighs, with four passenger convertible body, 1820 lb.

By M. W. Bourdon

ALTHOUGH in certain of its features the Standard light car possesses pronounced individualities, it can be said to exemplify a type of chassis which, especially since the war, has increased amazingly in popularity among British purchasers. In its various stages of development the Standard has kept step with the light car movement in Great Britain. This movement began to make itself seriously felt at the end of 1913, a previous spell of popularity of small, two-seated cars having proved evanescent. The modern light car has its foundations in the various chassis introduced in 1913 with small, four-cylinder engines rated at 10 hp., having a capacity of under 1100 cu. cm. (approximately 67 cu. in.) and a normal crankshaft speed of about 3000 r.p.m.

The original Standard was one of these early light cars, having at that time a four-cylinder, water-cooled block engine of 62x90 mm. (approximately 2 7/16 by 3 1/2 in.). The chassis had a wheelbase of 90 in., and obviously was not intended for nor fitted to accommodate other than a two-seated body, to which occasionally a dickey seat was added.

The 1921 Standard, apart from its engine, shows very few departures in fundamentals from the original of its type made in 1913. The chassis has, however, grown considerably, for it now has a wheelbase of 108 in., the track being 48 in., and the stock bodies include a four-passenger model as well as a two-passenger with a two-seated dickey. With this selection of body work, it is a type which is making a very forcible appeal and becoming exceedingly popular with a class of buyer looking for certain standards of comfort and passenger accommodation, with economy in running costs.

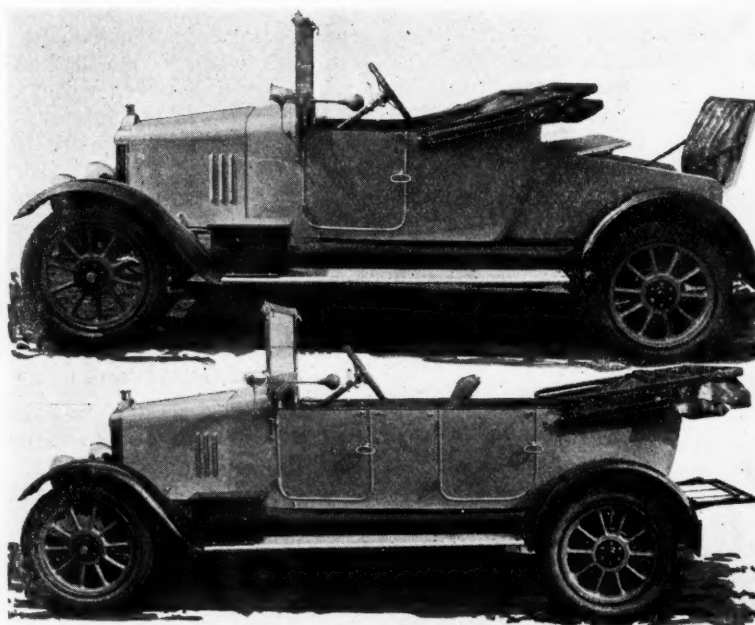
The following particulars of the Standard chassis

(which has been worked up to an output of approximately 70 per week) will make it evident that the British light car is quite a different proposition from the type of vehicle known as a light car in the United States. Originally it was quite a microscopic automobile, while even now it is still smaller, particularly in engine capacity, than those cars designated "light" in the United States. The 3-litre type of engine and chassis, which to outsiders appears only just to be coming into its own in America, obtained a good foothold in England at least ten years ago, and at the present day this type is looked

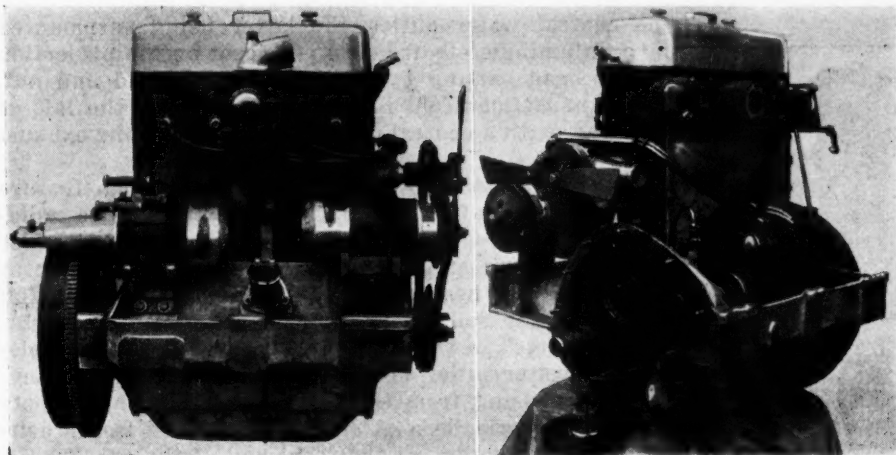
upon as something far removed from a light car.

The Standard has a four-cylinder, valve-in-head engine, with a bore and stroke of 2.7x4.3 in., which gives a cylinder capacity of approximately 97 cu. in. The valves have their seats directly in the detachable cylinder head, and are actuated by overhead rockers and push rods. Plain, spherical ended followers are used; they are set into cast iron guides and have cupped upper ends for the solid push rods, which apply through cupped extensions to spherical studs screwed into the undersides of the rockers. The accompany-

ing illustration shows the design of the rockers and rocker shaft. The latter is carried in three bearing brackets and is bored and threaded internally at one end to receive the union for a connecting pipe to the engine lubrication system. Oil is delivered into the stationary shaft at this end and is led through a counter bore to a deep groove running along the upper surface of the shaft. The lubricant then serves for the rockers, not only their pivot bearings, but also their push-rod ends, the rockers being drilled to convey oil to a thick felt washer located around the spherical stud between the rocker and the push-rod cup.



(Above)—Standard light car with two-passenger body and double dickey seat. (Below)—Standard four-passenger light car.



(To the Left)—Right side Standard light car engine. (To the Right)—Half front view Standard light car engine with chain cover removed. View shows supplementary water outlet at front end of cylinder head.

All moving parts of the overhead valve gear are, therefore, lubricated under pressure, the excess of oil exuding from the rockers finding its way back to the crankcase through the space—enclosed by an aluminum cover—up which the push rods pass on the left side of the cylinder block. The latter is an iron casting separate from the crankcase, which is a three-part unit of aluminum, the lowest section forming an oil sump. The upper section of the crankcase is formed with a webbed bracket extension on each side, enabling the engine to be carried directly in the main frame.

The crankshaft, having a flange to which the flywheel at the rear end is secured by four bolts, is carried in three white-metal bearings from the upper half of the crankcase. It is drilled for forced lubrication to the main bearings and crankpins, while leads from the main circuit are also taken to the three camshaft bearings. From the big end of each connecting rod 3/16-in. diameter copper tubing carries the oil to the piston pins; the latter are hollow, of 1 in. diameter and are a driving fit in the bosses of the aluminum pistons, which are of the straight-sided, split-skirt type, with three rings on

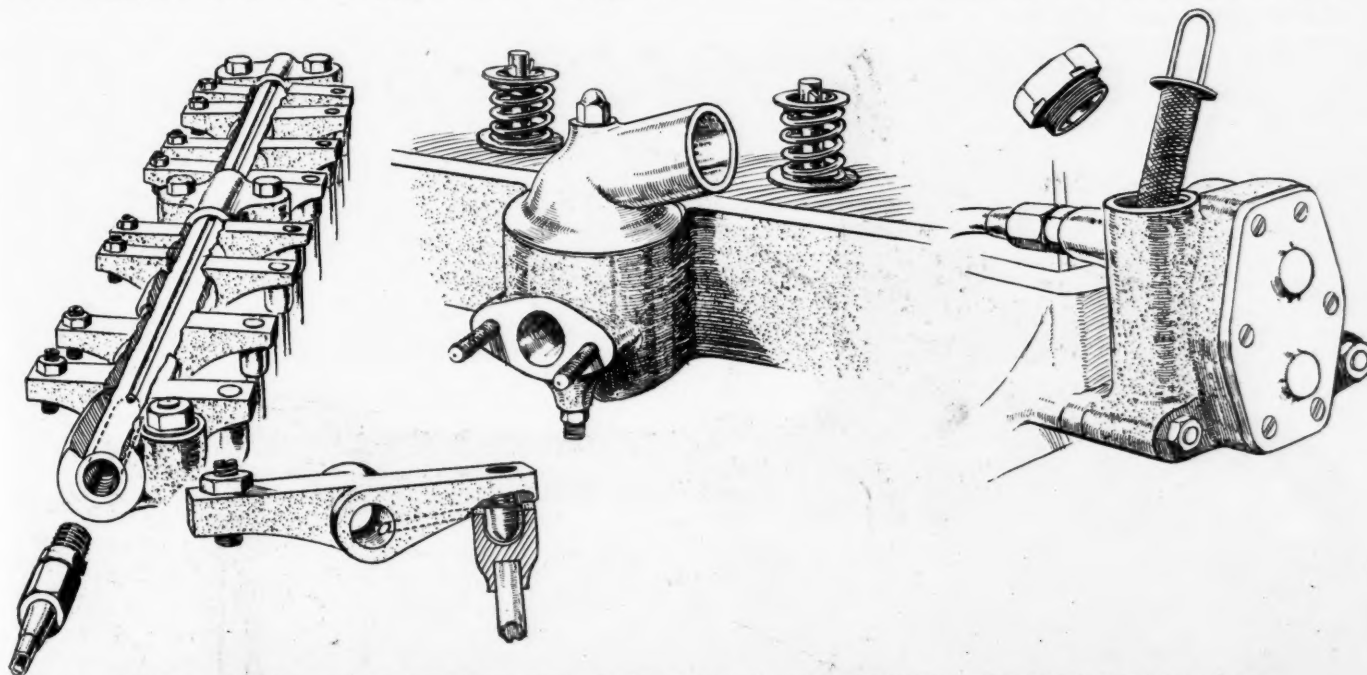
the crown and one inside the skirt. To prevent axial movement of the piston pin, aluminum end caps are fitted. The big ends have two bolts each, and their anti-friction metal is carried in bronze shells spaced by thick, solid shims.

A single silent chain passing over three sprockets serves for the distribution, the third sprocket being that of the magneto drive shaft, which, together with the magneto itself, is carried by an aluminum bracket capable of being moved bodily toward either side for chain adjustment. This sprocket shaft is carried by two phosphor bronze bushings with a space between them into which oil is led from a branch pipe, a second branch delivering lubricant to toothed side of chain.

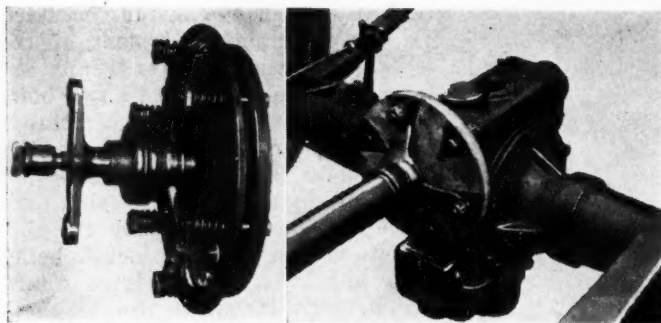
For lubrication purposes a gear type pump is used, driven by dogs on the rear end of the camshaft. The pump casing embodies a compartment for a small filter on the suction side, an exterior copper pipe from this chamber leading from an elbow located outside the sump and having attached to it a long, cylindrical filter projecting into the oil.

From the delivery side of the pump oil passes into a duct formed in the crankcase casting to the underside of a plunger which serves (1) to form a relief pressure valve when it is raised by oil pressure to uncover a port through which excess of lubricant returns to the crankcase and (2) to operate a vertical rod connected to an oil circulation indicator arranged on the dashboard. No spring has been found necessary to back this plunger valve, its own weight serving to maintain the oil pressure in the circulation system at the desired maximum.

From the relief pressure chamber (which is simply a hole drilled from above in the thickened rear wall of the crankcase) the lubricant passes to the rear end main bearing and thence to an exterior pipe on the left,



(To the Left)—Standard overhead valve gear, showing details of forced lubrication. (Center) Combined inlet flange and water outlet elbow on Standard cylinder head. (To the Right)—Standard combined gear pump and oil filter.



(To the Left)—Standard light car single plate clutch removed as unit from flywheel, to which it is secured by three bolts. (To the Right)—Center of Standard rear axle showing rear end propeller shaft joint and oil sump at front of axle casing center

of the crankcase with the leads to the other journal bearings and to the camshaft. From the front end branches run to the overhead rocker shaft, the silent chain and the magneto shaft bearings. The last-mentioned lead has in its length a cock which, when moved to a horizontal position, diverts the oil passing through, and allows it to issue through a small hole to indicate that the lubrication system is operating at this end of the engine.

The crankcase sump, which is separated from the crank chamber by a perforated gauze strainer, contains approximately three quarts of lubricant, and is provided with two means of indicating the oil level, the first an overflow cock with an extension handle brought up to a point near the filling elbow, and the second a float-operated plunger pin projecting alongside a graded plate. It will be observed from this that both oil circulation and oil level indicators are duplicated.

The carbureter, a horizontal type Zenith, with vacuum feed from an eight-gallon tank, has no provision for heating the ingoing air, but to assist vaporization the carbureter flange on the cylinder head is integral with the water outlet, and the entering mixture, before passing left and right within the head casting to the valve pockets, must pass round either side of

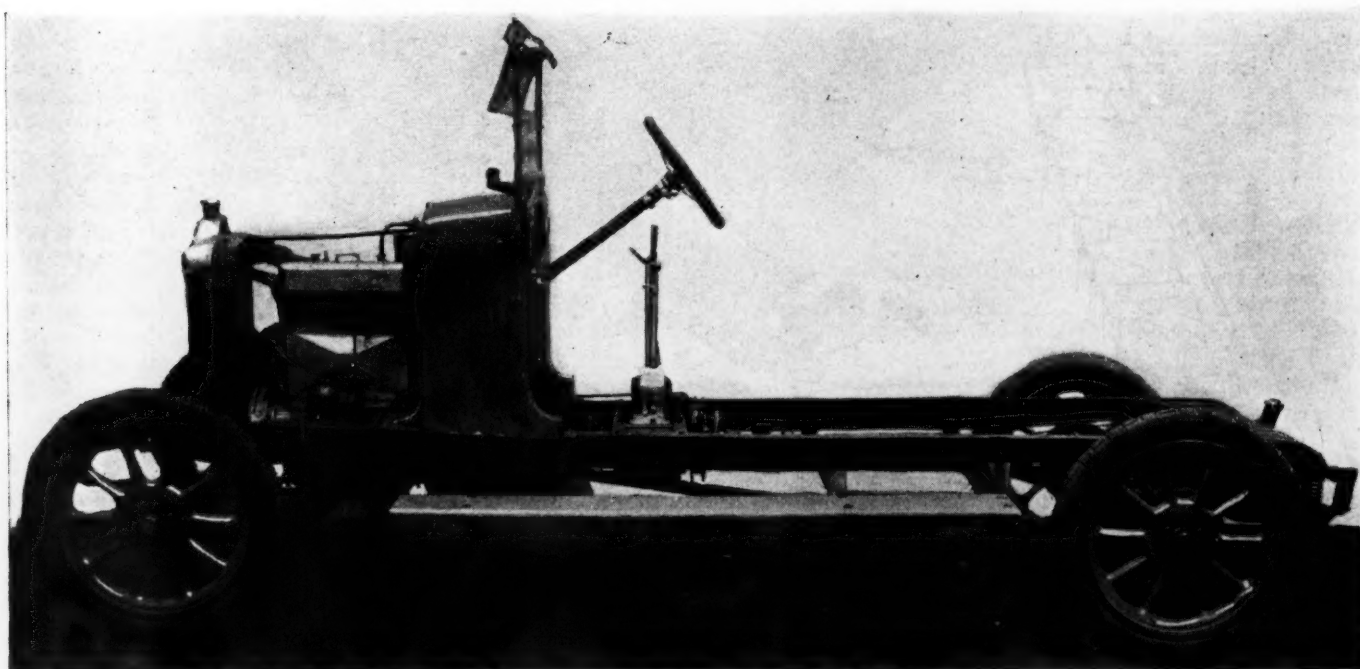
the central water outlet, the latter being surmounted by an aluminum elbow held to the seat on the projection of the head casting by a single central stud and nut. The exhaust manifold is a separate unit on the left of the head, with a central outlet and flange for the exhaust pipe.

Water circulation is by thermo syphon, but a feature to be observed is that, while the main outlet to the radiator is through an elbow on the right of the cylinder head, there is a supplementary outlet of $\frac{3}{8}$ in. bore at the front of the head casting, with a separate connection to the radiator tank. This arrangement appears to eliminate "pockets" in the water jacket; without the supplementary water outlet, head distortion and its accompanying evils arising from the formation of local hot-spots has been experienced. A simple two-bladed fan is belt-driven from a pulley at the front end of the crankshaft, this belt also serving for the dynamo, which is arranged on the right of the cylinder block on a bracket having lateral adjustment, the dynamo being secured to it by two vertical studs and a yoke. On the same side is the separate starting motor with a Bendix drive to the flywheel. The spark plugs are also on the right-hand side, being screwed into the cylinder head casting horizontally.

As may be inferred from the foregoing, the engine is a separate unit from the gear-set, the flywheel running exposed and enclosing the single plate clutch, to which the gear-set is coupled by a short shaft with a flexible disk joint at each end.

The single plate clutch is one designed and made by the Standard company, and has six direct-acting exterior springs separately adjustable. The driving plate floats axially upon the clutch shaft, having a hub boss internally splined to convey the drive to the shaft. Clutch withdrawal is effected by three exterior multiplying levers, each with adjustable studs taking effect upon thrust pins which abut the inner driving plate at their forward ends. This driving plate and the rear cover plate, which forms the second driving member, are faced with fabric rings, the driven plate being a steel unit.

The three-speed gear-set is slung by four bolts from two angle plates which form cross members of the frame. The gear shift lever shaft is carried in a bracket exten-



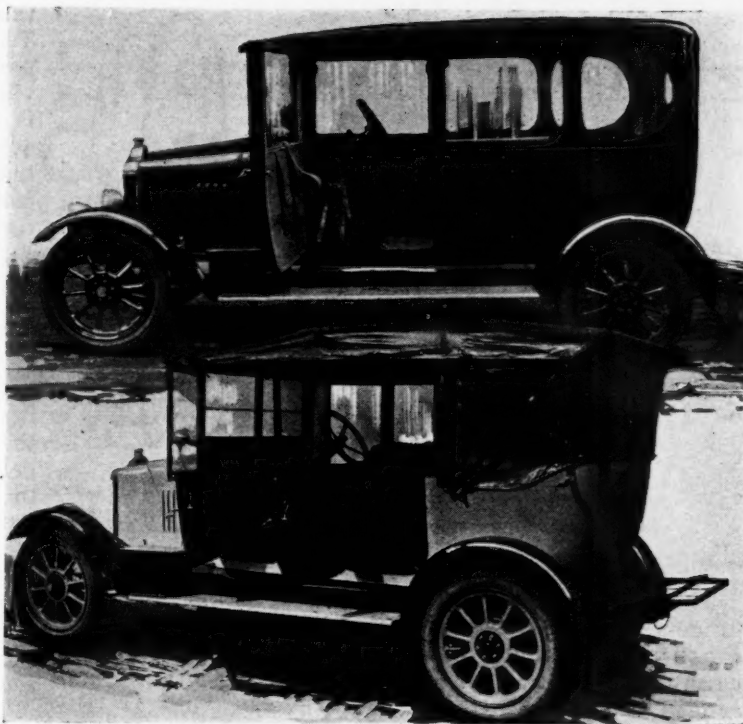
Left side Standard light car chassis.

sion of the lid of the box, the lever being on the right-hand side of the frame. All the gear shafts, with the exception of the reverse intermediate pinion, run on ball-bearings, though the pilot bearing is a phosphor bronze bush. There is nothing departing from usual practice in the general design of the gear-set, except, maybe, that its casing is a single unit with top and bottom cover plates and having its main shaft bearings housed in bolted-on cast-iron extensions. In assembling, the pinions are threaded over their shafts, the latter being entered through the bearing cap holes at either end. There is an external brake behind the gear-set, with deeply flanged shoes of aluminum with fabric liners. To the rearward extension of the drum is attached the front fabric joint of the open tubular propeller shaft, which has a similar joint at its rear end. The final drive is by overhead worm gearing with a straight worm (ratio 3.83 to 1), while the rear axle is of the semi-floating type with ball-bearings throughout.

The axle casing has an aluminum center with tapered steel extensions. To provide additional oil capacity the central casing has a forward extension or sump, in which a large filling orifice is arranged, in addition to one immediately over the worm. To prevent oil leakage from the central casing cast-iron flanged sleeves are provided at each side of the differential, backed by springs which tend always to keep the flange of each sleeve in good contact with internal webs of the casing provided to form a backing at each side for the ball thrust bearings. The rear wheel hubs are secured by nuts to the outer splined ends of the drive shafts, the hubs having flanges into which are screwed the studs holding the detachable wheels in place; over these studs and the hubs are threaded the brake drums, the studs thus taking both driving and braking torque. The rear wheel brakes are of the internal type, with a pair of cast-iron shoes, cam-operated, the open side of each drum being enclosed by a sheet steel cover plate to exclude dust and dirt.

The front axle is of an H section steel stamping, through the single ends of which the pivot pins pass with plain bushings in the jawed swivel axles. A ball thrust bearing to carry the weight and having an adjustment is located below an aluminum top cap.

Semi-elliptic springs are used fore and aft, those at the back being underslung and supplemented by a pair of helical springs at the rear end of each, these coil springs displacing the usual shackle. Drive and torque



(Above)—Standard chassis with sedan bodywork. (Below)—Standard four-passenger car with top raised and doors and side panels open.

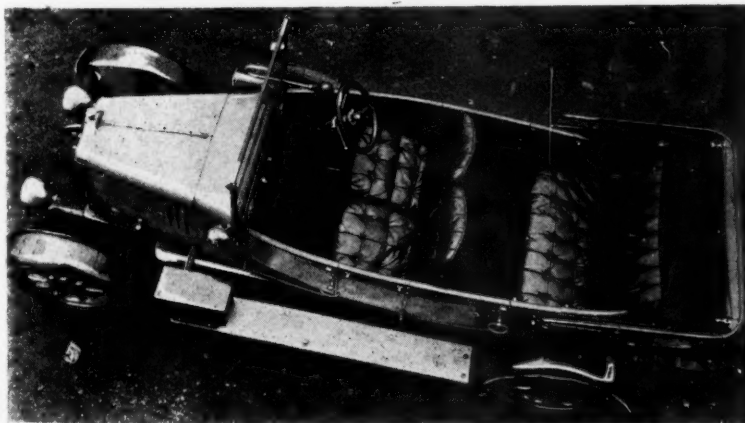
are taken through the front halves of the rear spring.

The steering gear is of the worm and full worm wheel type and has nothing out of the ordinary in its design, unless it be that the steering column has the ignition and throttle rods running parallel alongside, with ball-ended levers extending below the wheel.

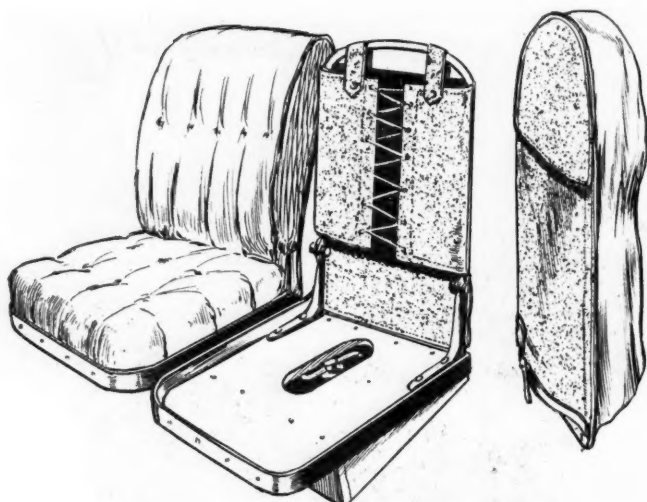
The frame consists of two flat-top, pressed-steel members narrowed at the front; cross members are numerous and varied, three of them serving also as stepboard supports, the remainder, beyond those already mentioned for the gear-set, including the one under the radiator, another with gusseted ends behind the axle and a cross tube, running between the rear dumb irons with extensions to carry the spring swivel plates.

In the four-passenger Standard bodywork are two special features, one of which is also found in modified form in the two-seater. In the first place, the separate front seats of the former are separately adjustable fore and aft and detachable. An accompanying sketch showing these seats is almost self-explanatory, but it may be said that there are no springs in the upholstery of the back rest, the flexibility in the hinged frame being considered sufficient to warrant the elimination of upholstery springs. The laced band allows for adjustment of the back rest to meet the ideas of individual owners, the loose upholstery having an inverted pocket which drops over the top of the frame and a strap below to prevent movement at that point. The seat cushion itself is square in plan, so that it can be turned about to bring any side to the front, and is upholstered with springs, as usual. It is of the same depth on all sides, the slope of the baseboard being sufficient to give the needed inclination from front to back.

Two threaded sockets are fitted to the floorboards for each seat, and into each of these passes a T-headed adjusting and locking bolt through a slot in the baseboard of the seat. Thus a wide range of fore and aft adjustment is provided and a limited range without actually displacing the bolt.



Bird's-eye view of Standard four-passenger light car.



Detachable and Adjustable Seats of Standard Light Car

The other special feature of the body is the provision of detachable and transparent side panels in place of the usual curtains. The panels have light, leather-covered metal frames, and those over the doors are arranged to open with the latter. The front one on the left, for instance, has a flap by which it is secured to the vertical frame of the windshield by two turn-buttons and a metal-edged slot which moves over a slide block on the door as the latter is opened; at the top rear corner is a spring catch which automatically secures the panel at this point when it is closed to the temporarily fixed panel alongside the front seats; in opening the door, this top corner lags somewhat and then clears itself from the catch.

The panel alongside the front seats has the rear door panel secured to it by an integral leather strip, which forms the hinge of the panel over the door. A similar slide block and snap catch are provided for this panel, and also for the corresponding one on the other side of the car. At each side of the rear passengers is a cur-

tain of black material which folds back with the top. To prevent draughts from passing in between the side panels and the top, a separate "weather strip" is provided which can either be left in position when the top is folded or detached by releasing the snap buttons securing it in place. The two-seater body has a similar transparent panel over its door on the left, but the corresponding panel on the other side is a fixture for the time it is in use.

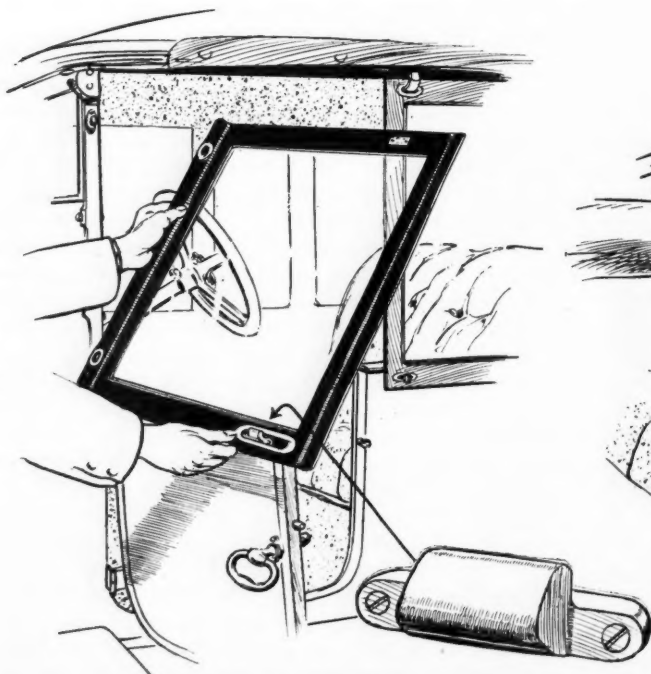
Provision is made for storing the side panels when out of use by forming a compartment behind the rear seat, which can be reached by lifting the hinged back upholstery, as shown in an accompanying illustration.

This special top, with its detachable side panels opening with the doors, is proving a great sales feature of Standard cars, for the arrangement not only overcomes the drawbacks of the usual side curtains when passengers are entering or leaving the car—there is no need to fasten or unfasten turn-buttons or snap catches—but the passengers are shielded from wind and weather almost as completely as in a sedan. There can be no question that a considerable proportion of sales are influenced to an appreciable extent by the fact that the top and the side panels provide, in the few minutes required to erect them, practically all the benefits of a sedan or coupé body.

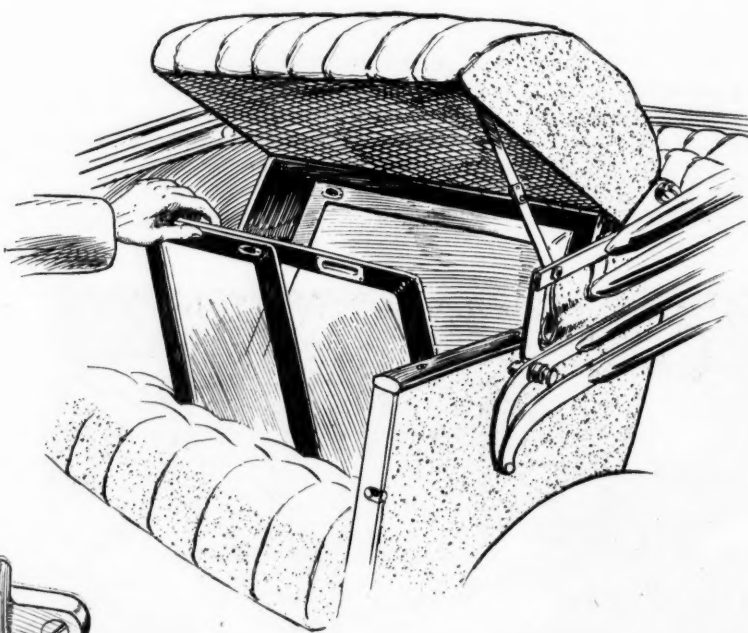
The following are some particulars of the chassis and complete cars:

Weight of chassis, 1270 lb. Weight of two-seater, 1700 lb. Weight of four-seater, 1820 lb. Overall length, 142 in. Overall width, 60 in. Tire and wheel size, 710 x 90 m.m. (28 x 3½ in.). Ground clearance, 9½ in. Gear ratios. High, 3.83 to 1. Middle, 6.76 to 1. Low, 12.95 to 1. Reverse, 17.27 to 1. Maximum road speed, approximately, 50 m.p.h. Road speed on high at 1500 r.p.m., 32.6 m.p.h. Fuel consumption at 25 m.p.h., average speed on normal British roads, 29 miles per gallon

SEVENTEEEN per cent of the March production of Harley-Davidson motorcycles was consumed by police and sheriffs departments in various states and cities.



Standard Detachable Side Panel, Which Opens with Door, the Free End Moving on a Slide Block Shown in Insert



Storage Room for Standard Side Panel Behind Hinged Upholstery of Rear Seat

The Tracking and Steering of Trailers Analyzed by a Graphic Method

Part I

An engineering investigation of factors bearing upon the steering and tracking of various trailer outfits. Free trailing more suitable for short hauling outfits; and steady steering for slow hauling.

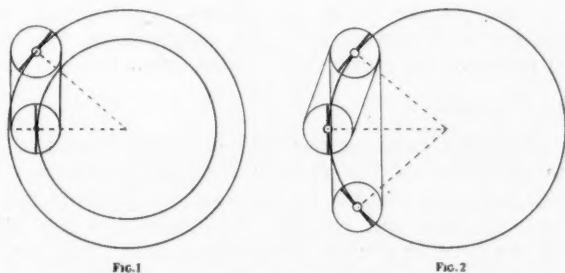
By Marius C. Krarup

THE Trick to Trek in the Track of a Truck or a Tractor with a Trailer or a Train, such might have been the alluring caption of alliterative design placed over this page, but for fear of deluding prospective readers into the belief that the subject lends itself charmingly to light and literary discussion. There would be disappointment. The burden of the unassuming theme is purely utilitarian. Its interest depends a good deal on the fact that various systems for tracking are in use and that each of them is advocated with some show of favoritism based on conviction. A choice exists, and one may be called upon to express it in one's own behalf in the form of a purchase. The choice may even come up in a larger way calling for Congressional committee work and voting, for the subject has a military angle with a throw-back relating to motor trucks and exports.

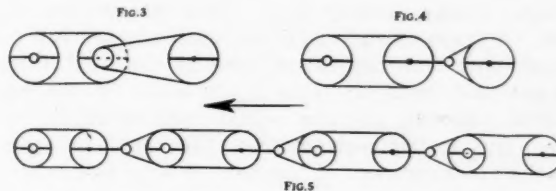
On examination it may be found that each system has its special uses. One may be compatible with considerable speed, another preferable for slow vehicles. Then there is the weighing of an advantage which can be enjoyed only in exceptional circumstances, against a disadvantage which is normal.

The system permitting the closest tracking also permits

the shortest turn, it is usually assumed, and ability to turn sharply when necessary is the main object in view. Hence find the closest tracking system, it may be said, and be done with it. But perhaps the assumption should not be accepted without reservation, since there is no tracking in a turn on the spot, for example. A "once over" of the subject in print and diagrams cannot help facilitating



Figs. 1 and 2—Simplest forms of trailing, Fig. 1, and tracking, Fig. 2. In any ordinary automobile or truck the rear wheels, though they are the driving wheels, trail freely in the general direction of the front wheels. When the latter follow a circular path, they follow a smaller circular path. The vehicle, with all four wheels under steering control, tracks on one circular path, once it is there. It can make as short a turn as the ordinary vehicle with its wheels turned only half as much in relation to the vehicle body as the front wheels of the ordinary vehicle are turned. Or its wheelbase can be doubled and it will still run on the same circle with its steering angle the same as that of the free-trailing vehicle. The principle of steering leading wheels to one course and following wheels to another course to make both pairs describe the same course is the paradoxical principle employed for obtaining all tracking effects, with variation only in the mechanical means.



Figs. 3, 4 and 5—Fig. 3 shows the symbolic figure representing a tractor cab or short truck with a semi-trailer hitched to it by means of a fifth-wheel coupling approximately in line with the rear wheel axle of the tractor unit. Rear wheels trail freely after the front wheels and the semi-trailer wheels freely after the rear wheels. No tracking is attempted. Fig. 4 represents a truck or automobile pulling a two-wheel trailer. The trailer tracks more or less closely after the rear truck wheels, because the pintle hook swings to the left, in relation to the trailer, when the truck turns to the right. Fig. 5 represents a tractor with a train of three four-wheel trailers, which may have either fifth-wheel steering or automobile steering linkage. All rear wheels trail freely, but front wheels of next unit track after them approximately. The total effect is far from tracking, but trains of trailers are used only for very favorable conditions, excluding sharp curves and grades.

conclusions. Here and there among the trite and true something slips in which is good to think with and over when decisions must be made.

Perfect tracking is secured by rails and flanged wheels but by no other means in common use, although the flange can be on the rails or may be separate and adjustable. The railway method of mounting four or eight wheels as a unit restricts the freedom of each wheel somewhat but not vitally. For each wheel that skews the rail one way, on a curve, there is another that skews it oppositely. But on relatively soft highways skewing is in lesser degree permissible, and each wheel should be free to roll tangentially to its curve.

Tracking produced not by the road itself but by a mechanical connection whereby a leading wheel steers a following wheel is faulty at the outset, because steering of the rear wheel is begun too soon, starting at the same

moment as the steering of the wheel in front of it, instead of in the same place. Tracking in the space of the wheelbase is necessarily sacrificed for a brief interval after each steering gesture. The rear wheels of the ordinary automobile, motor truck and tractor begin at once to cut into the curve described by the front wheels when these are turned. The tracking of a trailer is therefore often understood as tracking with the rear wheels of the leading vehicle, but the rear wheels of the trailer will cut into the tracking curve unless they are also steered. If tracking with the steering wheels of the tractor is forced, the interval of non-tracking at the beginning of each turn is lengthened and aggravated, but it is conceivable that the front wheels of the trailer can be made to track with the front wheels of the tractor and the rear wheels with the rear wheels of the tractor, if the wheelbases of the two vehicles are alike, and this possibility is attractive enough to look into. The plan of over-steering the front trailer wheels in order to make the rear trailer wheels track better is in fact one of the two represented in practice. Something of this kind must be done to solve the rather intricate problem of making a steering gesture now and getting the desired result a second or two later. Putting the problem in these terms, one perceives readily that geometry alone offers no clean-cut solution. Both in thought and in practice compromise must have the last word.

The other plan represented in practice is to steer all the trailing wheels. With a vehicle having all four wheels steered, the rear wheels start a turn by crossing the front wheel tracks, joining them again where these begin to curve. A train of such vehicles, with all steering gears connected, would zigzag throughout at the beginning of every turn and until all train units were on the curve. The initial steering gesture would meet prohibitive resistance. But by connecting from the frame of one vehicle to the steering gear of the next, a workable combination is obtained.

Fundamental Facts in Trailing

Figs. 1, 2, 3, 4 and 5 serve to illustrate some of the fundamental facts pertaining to trailing and tracking.

Without simplifying the plan views of vehicles and of the tracks they make, one cannot make much headway in looking into the details of the subject, or inducing others to look into them. Each vehicle is therefore represented in the accompanying diagrams by a partly symbolic figure suggesting the nature of its steering elements rather than picturing them, and each pair of wheels is condensed into one wheel midway between those of reality and making a single track. The indispensable dimensions of the vehicles are represented, however. On this plan a much larger number of diagrams than there is space for in these pages may readily be made and tried out, representing different tracking methods, different turning radiuses and maneuvers for each combination of vehicles.

Fig. 6 illustrates the turning of a truck with a wheelbase of about 13 ft. at a right-angled corner, the front wheels turning with a radius of $27\frac{1}{4}$ ft. and the rear wheels with a radius of 24 ft. It is seen that the turn can be made without any portion of the vehicle getting farther from the curb on either street than 13 ft., leaving 17 ft. clear for other vehicles on streets 30 ft. wide. Little or nothing could be gained by turning at a sharper angle, involving an average reduction of speed. If a trailer of the same wheelbase were attached, the outfit could not make the same turn without encumbering both streets more or else being made to track with its rear wheels close to the rear wheel tracks of the truck, at least at the point where the corner *C* projects. The principle employed for delaying the turning of the trailer

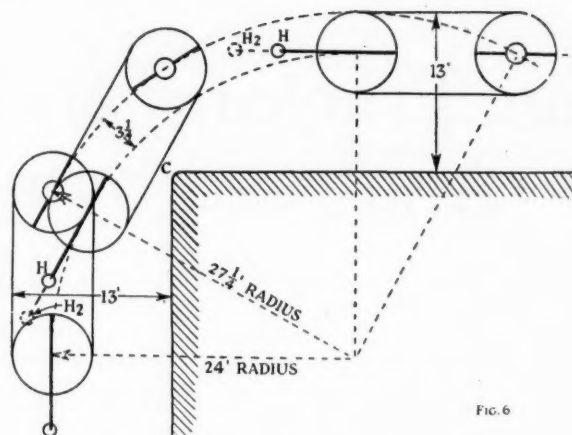


Fig. 6—A truck of 13-foot wheelbase turns a corner with one steering gesture and entirely on its own side of the road. The radius is 24 feet for rear wheels and $27\frac{1}{4}$ feet for front wheels. It is shown that a hook, *H* or *H2*, for attachment of a trailer, determines by its location how much trailer front wheels will be steered to the outside of the curve. And it is indicated that the overhang of the hook, in relation to the rear axle, must be very large to make trailer front wheels track after the truck's front wheels. To obtain this result, four-wheel steering of the trailer may be employed.

unit, and thereby obtaining the desired tracking, is indicated by the location of the hook *H* to which the drawbar of the trailer is attached. The greater its horizontal distance from the rear wheel axle, the farther the drawhead of the trailer is thrown to the left, turning the trailer front wheels in the same direction, when the tractor unit begins turning sharply to the right. If the tractor unit has a considerable overhang, as in many trucks, the hook may be at such a distance as that represented by *H2*, and the trailer front wheels are thrown to the left with notable velocity, involving a considerable overcoming of inertia and creation of momentum with reactions on the tractor unit taking effect in its materials and at the points of contact of its rear wheels with the ground, but these factors can be minimized by starting a turn gradually, which is, however, equivalent to making a less sharp turn and encumbering the road more. The principles are seen most clearly by contemplating a turn made as sharply as it is considered desirable to have turns made, in which respect the example of the truck alone is perhaps the ruling one or the ideal kept in mind.

Causes of Snaking

It is seen that turning the trailer front wheels in the opposite direction of the truck's turn immediately after a steering gesture results in snaking for a short period after each gesture, but the undesirable effects are minimized if the turn is evenly sustained and is made slowly. On the road, however, the driver frequently finds occasion, unless he anticipates every steering gesture required by the traffic or the nature of the road, to turn the front wheels of the tractor unit at an angle just as large as that which would produce a short right angle turn if sustained, and very shortly afterward he must make an opposite gesture whereby the snaking is prolonged; and his speed is likely to be considerably higher than at a deliberate turning of a corner.

Fig. 7 represents wheel tracks of a vehicle having free-trailing rear wheels and Fig. 8 those of approximate tracking in its simplest form. In both cases the path of the front wheels is chosen arbitrarily. Advantages and disadvantages for both methods appear plainly in these graphs, and it may be particularly noticed that the suc-

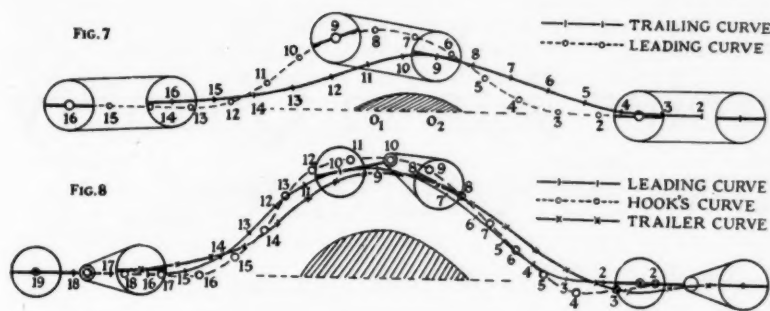


Fig. 7—Tracks of vehicle, with free-trailing rear wheels, making a turnout to avoid obstacle or hole in the road. Fig. 8—Tracks of leading and trailing wheels held in relation for approximate tracking and making a turnout, unnecessarily wide, around obstacle or hole in the road, and the path of the coupling hook which compels the tracking. The symbolic figure may represent a vehicle with four-wheel steering or the rear wheels of a truck drawing a two-wheel trailer. It is noticed that with tracking arrangement the trailing wheels travel more nearly the same distance as the leading wheels, but that the path of the hook is longer than either wheel path. The latter is true only for composite curves. By drawing the curves on a large scale and measuring distances between construction points on both leading and trailing curves, a comparison may be established giving interesting information on accelerations and retardations as well as the work of the drawbar spring, to equalize the varying inertia.

cession of at least four steering gestures, as required for a turnout on the straight road, causes more pronounced snaking than a single and sustained turning movement.

Certain conclusions are thus foreshadowed at the very first view of subject, to the effect that close tracking is suited mainly for slow hauling and that the degree of forcible tracking employed for faster forms of transportation should be determined mainly by choosing the longest turning radius which is practically satisfactory and the smallest degree of forcing of the trailer wheels by which this radius can be realized. A comforting mechanical possibility, yet to be exploited, lies in simple provisions for adjusting the tracking qualities to the nature of the service and the desired speed. A careful driver can naturally be trusted with a close-tracking outfit better than one who does not understand its effects after each steering gesture. An adjustment would consist in shifting the hook or pivotal connection of the two vehicles, on the principle that the farther it is from the rear axle of the tractor unit and the nearer to the front axle of the trailer the more the front trailer wheels will be forced outwardly from their natural trailing curve.

If the trailer is equipped with automobile steering linkage, double means are at hand for forcing the tracking. The overhang of the hook in relation to the truck axle may be reduced, and any desired effect in the steering of the trailer front wheels can nevertheless be obtained by varying the proportions in the elements of the linkage. In Fig. 9, the set of the arms *C, C*, in conjunction with the nature of the joints at *D* (or equivalent means used for moving the tie-rod laterally) takes care of the slightly different angles at which the two wheels must be turned on account of the axle being fixed—as in the use of the same system for automobiles and trucks—but the degree of turn effected by a given movement of *H*, the hook, is determined by the relative as well as the absolute dimensions of *A, B* and *C*. If the wheels are turned more than the drawbar, an effect of forcible steering, in addition to that caused by the overhang of the hook, is obtained, and a share of the stresses of various kinds due to such steering is shifted from the truck to the trailer, as compared with producing the same steering angle

by means of axle steering (fifth-wheel) and a longer overhang of the hook. Evidently the equivalence of the systems does not extend beyond the limitation of the turning angle to which automobile steering linkage is subject, which is about 30 degrees, while axle steering has no inherent limitation of this sort, but aside from this reservation a formula for figuring the equivalent of one system in the other, for the same distance between the vehicle axles, can be reasoned out directly from a contemplation of the action and leverages involved, and it takes the following form:

$$O_2 = O_1 \times \frac{B}{C} \times \frac{O_1 + A \pm (B - C)}{O_1 \times \frac{B}{C} + A}$$

where O_1 is the distance of the coupling hook from the rear axle in the case of the automobile-steered trailer and O_2 the corresponding distance at which the hook must be placed in the case of the axle-steered trailer. The plus-minus refers to whether the draglink is behind or in front of the trailer front axle. If the distance between vehicle axles is to be longer or shorter, O_2 is simply to be lengthened or shortened in the same proportion. Applying the formula, one sees that if $B = C$, then $O_1 = O_2$. If O_1 is 4 ft., A 5 ft., B 1 ft. and C 9 in., then O_2 should be $4 = 24/31$ ft. to make the steering effects the same in both cases.

(To be continued.)

IN calculating the cost of tractor work, the interest on investment, depreciation and storage charges per year should be divided by 45 (that being the average number of days' work of farm tractors per year) and to this added the cost of fuel, oil and wages per day. The cost of tractor plowing figured out to about \$2.50 per acre in 1920 and to from \$3 to \$3.50 for breaking. The U. S. Bureau of Agriculture recommends that interest charges be figured on one-half of the cost price of the tractor only, as the book value of the tractor decreases from year to year.

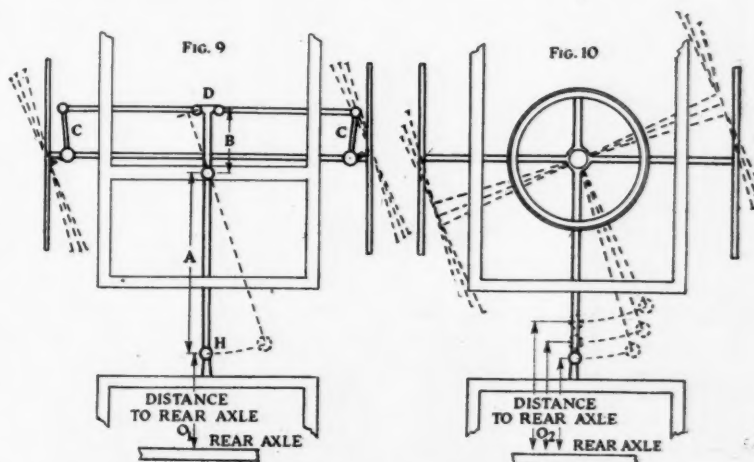


Fig. 9—Diagram of automobile steering linkage (same as Ackerman or wheel steering) for trailer. Fig. 10—Diagram of fifth-wheel or axle steering for trailer. In conjunction the diagrams are meant to show that diagrams suggesting axle steering can represent automobile steering as well, as with the same distance between axles identical steering effects can be obtained from the two systems. With a given relative movement of the hook *H*, in Fig. 9, different turns of the wheels can be obtained according to the leverages employed in the linkage. The same variations can be produced with axle steering, as indicated in Fig. 10, by increasing the overhang of the hook in relation to the rear axle of the leading vehicle, and thereby the movement of the hook. The formula for equivalent designs is given in the text.

Calibrating Carbureter Jets in Quantity by Actual Flow Measurement

Apparatus used by Zenith Carbureter Co. consists of a tank with constant head, device for holding jet, electrically controlled timing elements, and graduates for measuring volume of flow in unit time. Each operator can test 160 jets per hour by the use of one calibrating machine.

By J. Edward Schipper

ONE of the most important operations in the Zenith factory is that involved in testing fuel jets. The orifices in the jets are so small that ordinary methods of inspection are not applicable. The function of the orifice or hole is to meter the fuel and it is believed that the best way to find out whether or not these jets will measure out the desired amount when assembled in a carburetor, is to determine by actual test how much liquid under given pressure will be measured out in a given time. The accompanying view of the jet testing machine (Fig. 1) shows the apparatus used for this purpose. All Zenith jets are tested by this method. The machines consist of a large tank in which a float controls the inlet of the water (with which the jets are tested) in such a manner that the level is maintained at a given

point A, Fig. 1. From this tank, four pipes extend downward and terminate in special valves B, under which the jets being tested are clamped. When the valves are opened, water flows through the jets into special glass graduates C which can be readily emptied by turning valves B at their lower ends.

The clamping of the jet is done by a lever, and a spring at the rear of the machine presses each lever into the valve, thus clamping the jet. Pedals D are provided for releasing and opening these clamps. In order to measure with accuracy the time during which the flow is taken into the graduate, a small sheet brass box, E, Fig. 2, is used. This can be swung under the jet and diverts the flow into a waste pan F. When this box is swung under the jet the water flows to waste, then the box is withdrawn for one

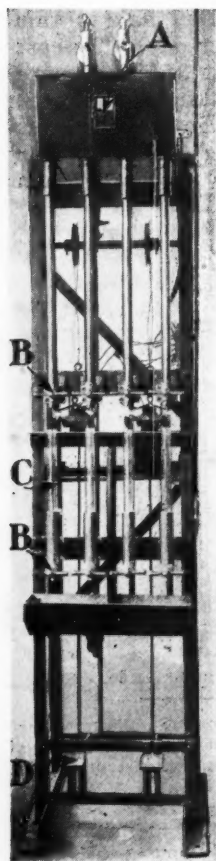


Fig. 1

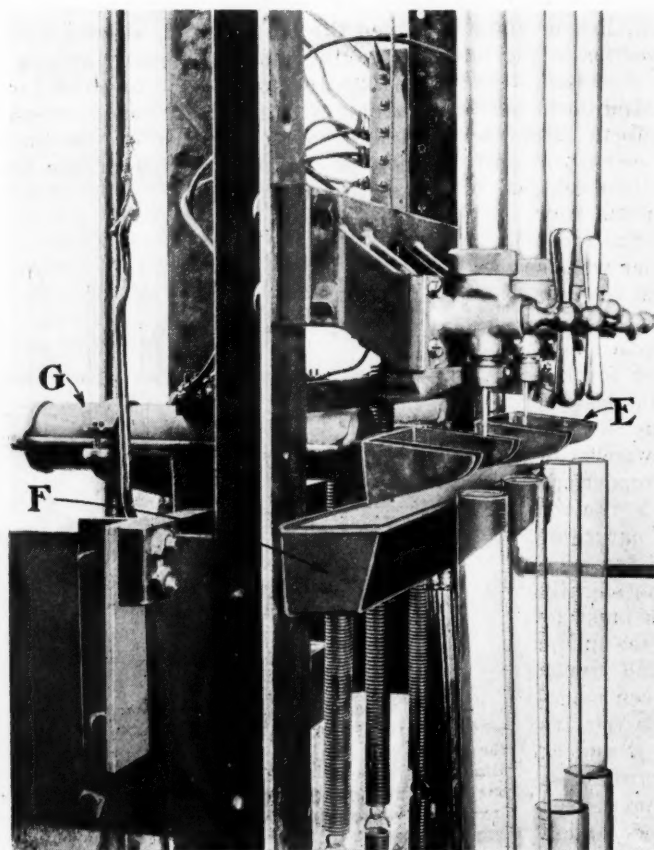


Fig. 2

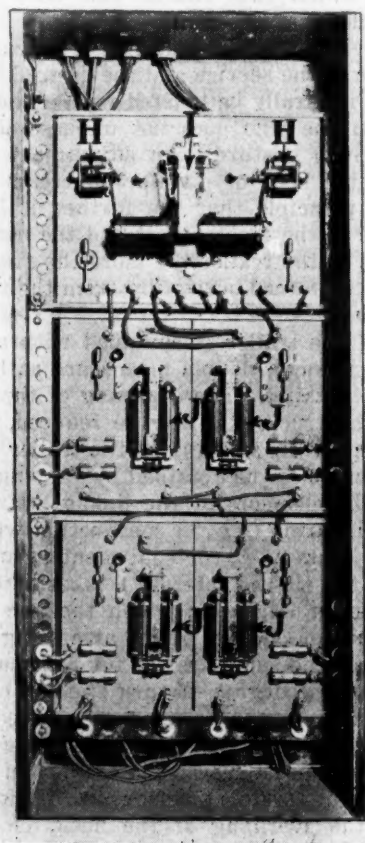


Fig. 3

Three views of the apparatus used in production tests of fuel jets used in Zenith carburetors

minute during which the water flows into the graduate. The movement of the box is controlled electrically by the use of armored solenoids G, two boxes being connected together and operated by the same solenoids, one solenoid for pushing the box under the jet and the other for withdrawing it.

To control the time, the electrical apparatus shown in Fig. 3 is used. A master clock mounted in another part of the building, and having a standard pendulum, is used. The pendulum makes one oscillation per second, so that two contacts are used, one on each side of the pendulum; these contacts are connected to the telegraphic relays H which control the two solenoids of the distributor I. The

armatures of the solenoids reproduce accurately the movements of the master pendulum, but with enough force to actuate, through suitable gearing, a distributor I, which sends impulses to one or the other of the four large relays J. These relays, in turn, actuate the solenoids of each testing machine.

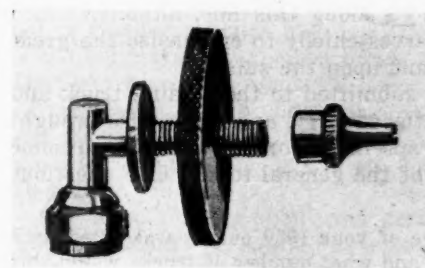
On each machine the flow is sent to the graduates for one minute and diverted to the waste pan for one-half minute, thus making a cycle of ninety seconds. One-half of the machine is made to lag behind the other half by 45 seconds, for convenience in operation. One operator can, with each machine, test four jets in one and one-half minutes or 160 per hour.

Laminated Wood Disk Wheels

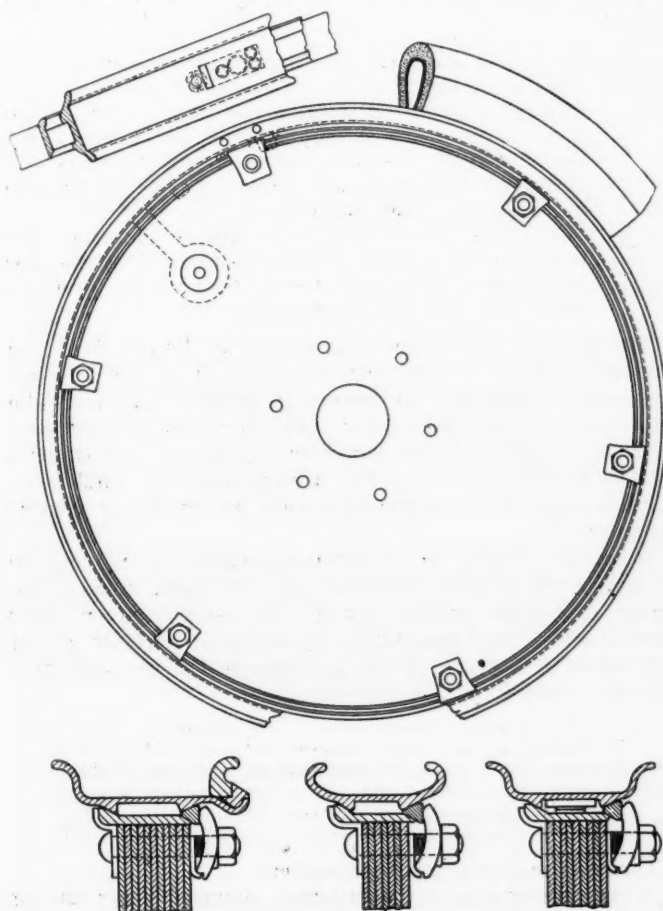
WHEELS with laminated wood disks are manufactured by the Dayton Automotive Wheel Co. The disks are built up of thin, rotary-cut plies of wood glued together under pressure with waterproof glue. The grain of each layer runs in a different direction from that of the layer next to it. This process of lamination is said to make the complete disk very strong, non-warpable and resilient. The weight of these wheels is substantially the same as that of a spoked wood wheel, but the resistance to transverse shocks is said to be much greater.

In order to render inflation of the pneumatic tire convenient, a patented angle connection is furnished, which goes onto the tire valve stem and permits the tire to be inflated from the outside face of the wheel. The design of the wheel is such that the disk can readily be fitted to any standard hub and rim. The accompanying illustration shows the disk used in connection with a Firestone demountable rim. At the center the disk is clamped

between the two hub flanges. The wheel is designed for use with demountable rims only and is not a demountable wheel. Among the advantages over spoked wheels claimed for this wheel is that road shocks are distributed over the whole wheel, instead of being localized at the felloe.



Angle valve connection for Dayton wheel



The Dayton wood disk wheel

Changes in the Bates Steel Mule

THE Model F Bates Steel Mule, made by the Bates Machine & Tractor Co., has succeeded the Model D. It is equipped with a Midwest engine. The fuel tank is hinged at the dash board, so that it can be raised when working on the engine valves. Different turning brakes are used than on the Model D. The braking system is now made so the operator can hold either crawler still and pivot around it with the other crawler. Other changes include the adoption of a water type air cleaner and a different make of carbureter. The rating is changed to 18 hp. on the draw bar and 25 hp. on the belt, and the weight is changed to 4850 pounds. A platform has been added and a few other modifications made to make the driver more comfortable.

The Model G is a heavy design built for industrial work exclusively. A power driven winch can be attached to the front end for logging and other work. The weight of the tractor is approximately 6500 lbs. and it has a rating of 25 hp. on the draw bar and 35 hp. on the belt.

As on the Model F, all working parts are encased against dust and run in an oil bath. Wheels, transmission and crawlers have roller bearings exclusively. The clutch is a hand operated, dry disk type. The driver's seat is made to swivel so that it can be pushed out of the way when the driver is standing on the platform. The pedals for holding either crawler still are located on the platform at the rear of the tractor. Hauling speeds are $2\frac{1}{2}$ and $3\frac{1}{2}$ m.p.h. and the reverse speed is approximately 2 m.p.h.

A BRITISH standard specification has been issued by the British Engineering Standards Association for benzol for motor fuel, commonly known as "benzole." The specification includes a definition of the term "benzole," and notes on its physical and chemical properties.

Use of Pneumatics Limited on Trucks of More Than 3½-Ton Capacity

This is general opinion among prominent truck and tire builders expressed in reply to recent questionnaire submitted by AUTOMOTIVE INDUSTRIES. There is wide difference of opinion upon almost every phase of the pneumatic tire question, especially as regards the attitude of the public.

THERE is considerable difference of opinion among authorities as regards the possibilities for usefulness of pneumatic tire equipment for trucks. Probably no question in the automotive field has aroused more discussion during recent years. A survey which has just been completed by AUTOMOTIVE INDUSTRIES brings to light some interesting opinions along this line, although much of the data collected serves chiefly to emphasize the great variety of opinion extant upon the subject.

Five questions were submitted to the leading truck and tire manufacturers of the country, and the replies brought not only considerable specific information but also some interesting discussion of the general topic. The questions were as follows:

1. What percentage of your 1920 output was fitted with pneumatic tires and what number of trucks would this represent?
2. On what capacity trucks were the pneumatics fitted?
3. What in your opinion is the largest capacity truck on which the pneumatic can be satisfactorily used?
4. What is the present attitude of the buying public with regard to pneumatics for trucks of capacity of 3 tons and up?
5. Is there likely to be gradually less use made of larger capacity vehicles and greater use of an increased number of medium capacity trucks?

There seems to be rather general agreement concerning the limitations of pneumatic equipment for trucks of more than 3½ tons. Only 11 per cent of those replying considered such equipment to be practicable on 5-ton jobs, while a number of these considered it advisable only under certain conditions. The answers as regards the maximum capacity on which pneumatic equipment is practicable showed the following results, the percentage figures indicating the proportion of those replying who considered the given capacity as the largest practicable for pneumatic equipment:

2½ tons	30%
3 tons	21%
3½ tons	19%
2 tons	17%
5 tons	11%
1½ tons	2%

These figures indicate that a majority of truck manufacturers believe 2½ to 3 tons to be the largest capacity on which it is feasible to use pneumatic equipment, while a considerable percentage place the limit at 3½ tons. The replies received, however, indicate that to a certain extent the opinion of the manufacturer is influenced by the limitations of his personal experience and by the type of truck which constitutes the bulk of his own production. This factor of error almost inevitably enters any such survey to a greater or less extent, but should be considered in analysing the results.

One company which has had a wide experience states: "We still believe that 3½ tons is probably the maximum size on which pneumatics can be particularly successful at present. As a matter of fact, we would not advocate the use of pneumatics on 3½-ton jobs unless the nature of the service was carefully analyzed and sufficient assurance obtainable that tires would not be badly overloaded and that operating conditions were such as to enable this equipment to justify its higher cost."

This comment is especially interesting since it comes from a company which has been extremely active in pneumatic tire propaganda.

Another interesting opinion states, in answer to this question: "As a general proposition, 2 tons, although for certain special applications pneumatics are satisfactory up to 3 tons."

There were numerous objections advanced to the use of pneumatics on the larger sized trucks, the most important of which are included in the following quotation from one letter:

1. "Excessive overloading. The pneumatic tire will not stand up under an excessive overload."
2. "Under inflation. A great many users fail to appreciate the necessity of high inflation pressures so that the tires fail in the same manner as when overloaded."
3. "Small cuts in tires, caused from sharp stones, etc., are neglected until they cause failure."
4. "Very few repair shops have proper equipment for repairing pneumatics, so that in many cases the user cannot get proper repairs even though he may be perfectly conscientious in the matter."

The general conclusion that might be drawn from the various statements and the statistics presented is that pneumatic equipment is generally accepted as desirable on trucks of less than 2-ton capacity; that a good proportion of manufacturers consider it feasible in most cases on 3 to 3½-ton jobs; but that a comparatively small number are sold on pneumatic equipment for trucks of greater capacity.

It is not possible to estimate accurately the percentage of trucks which were pneumatically equipped, since a majority of replies merely stated the percentage of their output which was pneumatically equipped without giving the output. A study of the percentage figures submitted, however, shows that out of 71 replies

10 equipped pneumatically under	9% of total
10 equipped pneumatically between 10% and	24% of total
16 equipped pneumatically between 25% and	49% of total
11 equipped pneumatically between 50% and	74% of total
6 equipped pneumatically between 75% and	89% of total
18 equipped pneumatically between 90% and 100% of total	

One of the tire companies states:

"Our deliveries of tires to truck manufacturers during the past year have run 75 per cent pneumatics and 25

per cent solids. However, the bulk of these pneumatic tire deliveries were of the so-called passenger tire sizes, that is, 35 x 5 and under.

"Our own estimates have been that about 50 per cent, at least, of all the trucks built were equipped with pneumatics."

Estimating as closely as possible on the basis of the data received, it would appear that about 60 per cent of the trucks of 2½ tons or less capacity were pneumatically equipped during 1920. This is, of course, only a rough estimate and would indicate that the figure of 50 per cent for all trucks is not far off, although it is probably high.

Attitude of the Buying Public

The replies as regards the attitude of the buying public indicated that very little analysis had been made of the problem from this angle. All degrees of enthusiasm for pneumatics were attributed to the public by different manufacturers. The three opinions in answer to this question cited here will visualize the varying ideas on this subject.

One truck maker who produces 1-ton, 2½-ton and 3-ton trucks says:

"Present attitude of the buying public toward pneumatic tires is that they are a good thing, and that more of them will be used as time passes. Undoubtedly pneumatic tires will be used on a larger percentage of motor trucks up to 3½-ton size in 1921 than ever before, and 1922 will certainly see a great increase in the use of pneumatic tires over 1921."

A somewhat modified view is taken by a manufacturer on a 1½-ton speed truck and a 3½ model. He states:

"From our experience we judge that the truck-buying public is in a fairly receptive mood toward pneumatic tires on heavy duty trucks, but until the truck manufacturer himself removes the question in the minds of the buyers as to the ability of the tires to stand up and prove their economy, we doubt if a very large active demand will be created."

While a third truck producer, who also makes three models, 1-ton, 1½-ton and 3½-ton respectively, takes an almost directly opposite view. He says:

"Personally I feel that the pneumatic tire proposition has been boosted very highly and has been overrated. . . . As far as I can see, I believe that pneumatic tires for heavy trucks is not looked upon as favorably to-day as it was a year or a year and a half ago."

This latter manufacturer is supported by another who states that he "must advise that we find a very decided reaction against the use of pneumatics of size larger than 38 x 7," which corresponds to the rear of a 1½-ton truck. And still another maker takes a still different ground with this statement: "We believe that they feel very favorable toward pneumatic fronts, however; they are very much against pneumatic tires for the rear."

With these typical and varying opinions from which to choose, it is impossible to state any decided trend as indicated by the replies on this point. The only trend which might be implied is that the public is equally divided in its opinion, and that there is no majority opinion among truck users on the subject at the present time.

More Light Trucks

The probability of an increase in number of light trucks to replace one heavy truck is not agreed upon very generally, although a majority of those replying to the questionnaire think the trend will be in that direction. Too much importance cannot be attached to this fact, however, since a majority of truck manufacturers produce medium and lightweight trucks.

The chief factors in bringing about the decrease in heavy trucks, according to the general opinion, are likely to be restrictive State legislation, excessive taxation, and inability or refusal to build roads adequate to stand up under heavy-truck traffic.

It is evident, however, that these factors can be controlled to a large extent. They are not inevitable developments, and will be influenced by the ability of the heavy truck to prove itself an essential factor of transportation. One producer says, for instance:

"The railroads are freely admitting that the motor truck is a logical solution of the short-haul problem and with this, as only one incident, we believe, shipping by truck is on the increase rather than on the decline. This is naturally going to increase the wear on the highways and it seems to us that the solution is to build the highways to last."

Another statement is:

"Regarding the possibility of the future limitations in the use of heavy capacity vehicles with solid tires and the substitution of a larger number of pneumatic tired vehicles, I am of the opinion that such a result is hardly likely unless it is forced by unwise and ill-considered legislation. In that event, I believe the result will not be the displacement of the larger vehicles by a proportionate number of smaller vehicles but will result in the curtailment of the old transportation by motor vehicles until such restrictions have been removed."

One heavy truck producer believes that "the reason so few words are spoken in favor of the heavy truck is because so few manufacturers are building heavy trucks." He goes on to say:

"Were we to keep silent and permit legislators to condemn the American public to the continuance of the short-sighted and extravagant policy of building flimsy roads and restricting freight transport to multitudes of light trucks, our business would not necessarily suffer, inasmuch as we build trucks down to 1½ tons."

An opposite point of view is taken by others, however, one of whom states on this point that "5-ton trucks and over will in several years be eliminated from our highways and the smaller trucks, preferably the 2½-ton size will be the common carrier." And this view is endorsed by another statement, as follows: "I am strongly of the opinion that eventually the greater majority of motor trucks will be pneumatically equipped and that the maximum capacities will be kept down to a reasonable point somewhere between three and five tons."

These replies have been quoted as being typical of the opinion expressed on both sides of the problem. None of the replies took up this phase of the question from the cost of transportation standpoint, considering the factors of speed and light weight, as opposed to large carrying capacity. The possibilities differ greatly, of course, in each particular case, yet the general transportation needs of users would seem to be at least an important factor in determining whether or not heavy trucks will increase or decrease in number. This is specially true when it is considered that truck users are also citizens and are likely to exert some influence in connection with legislation and highway building.

THE British Research Association for Liquid Fuels for Oil Engines Industry has been approved by the Department of Scientific and Industrial Research as complying with the conditions laid down in the Government scheme for the encouragement of industrial research. As the association is to be registered as a non-profit-sharing company the promoters have applied to the Board of Trade for the issue of a license under Section 20 of the Companies' (Consolidation) Act of 1908.

About Curled Hair for Car Upholstery

The bases, colors, uses and manufacturing processes of curled hair are briefly described in this article. The advantages of curled hair as an upholstery filler are pointed out, and the tools used are discussed.

By C. A. Podesta*

THE basis of all curled hair made is horse hair, cattle hair and hog hair. Horse hair comes from horse tails and manes, and there is a wide difference in the value and usefulness of tail hair and mane hair. Horse tail hair is stiff and straight, and its longer staple is used for hair cloth which goes into the lapels of coats for stiffening purposes, in which case it is woven with cotton thread; in some instances it furnishes its own woof and warp, in the making of a pure hair cloth with which to cover upholstery. It is also hackled or drawn into various lengths of brush hair, and is particularly suitable for this use because it lies straight and withstands the elements as well as oils and alkali soaps.

Probably the most important use of horse tail hair is as a basis for curled hair. Its stiffness when in spiral form gives it a great range of resiliency, and its ability to withstand constant depression and subsequent release, as well as its immunity to the deteriorating influences of the elements, makes it particularly good as a long lived upholstery filler.

Horse mane hair is less valuable than horse tail hair, because it is much softer, and its range of resiliency is much less. On the other hand, its affinity for other types of hair when mixed therewith makes it a good binder when used with cheaper, shorter hairs in various curled hair mixtures, and although of less value and less downright worth, it performs its function as above described well. Horse mane hair, because of its soft contact when used in curled hair, has recommended itself to a great many people as an upholstery filler, and has been in particular demand by our Government in the making of Navy mattresses.

Cattle tail hair, or the hair coming from the tassel at the end of the cattle tail, furnishes a most desirable curled hair material, in that it is longer lived than horse hair, possesses a wider range of resiliency, develops less breakage and is neither as hard as horse tail hair nor as soft as mane hair but rather a happy mean between the two.

Hog hair is obtained at the time of the slaughter of the animals and is thoroughly cured and sterilized before being used in the manufacture of curled hair. Hog hair is less valuable than horse and cattle hair only because of its shorter staple, and is used in various formulæ to assist in the reduction of price. If one were to take a piece of horse hair of the exact size and length of the hog hair, he would find them both of equal value, and the horse and cattle hair are therefore only more valuable than hog hair because of their greater length and the possibility of placing more convolutions in each long hair than one can in a short hair, thus increasing the range of resiliency in a mass of curled hair.

The three principal colors in which curled hair is manufactured and sold are black, grey and white. The hair of all animals necessarily grows promiscuously as regards color, and it becomes necessary to separate the white and

black, leaving the balance of the colors to be known as "blend," "gray" or "colors," each of these names being used by people in various parts of the world to designate the mixed remainder. The mixed remainder necessarily represents the largest proportion of curled hair materials, and it therefore becomes necessary at times to dye some of these materials in order to have a sufficient volume of black, and sometimes a mixture of both is used.

White, on the other hand, is always a natural white, and is sometimes bleached for some fastidious user who fancies that white is the best grade of hair and is willing to pay a larger price for white according to its degree of apparent purity. White hair is invariably cattle tail hair, although some unconscionable sellers have told the trade that it is horse hair. By actual test we have found that only 3 per cent of the world's output of horse hair is natural white, and the labor involved in separating this small percentage from a large mass of materials would not be warranted.

The manufacture of curled hair consists in assembling various raw materials into a mass called a formula, thoroughly mixing them and spinning the mixture by hand and machinery into a rope, after which it is doubly twisted like a tourniquet and bound up in this form; it is next placed in a vat with chemicals designed to thoroughly sterilize it, and boiled for several hours with a view to setting the twist that has been placed in it, after which it is bundled and put in a room to season. The degree of rebound in curled hair is controlled largely by the length of time that it remains in rope form in the seasoning room.

Curled hair forms an ideal upholstery filler, and its use adds prestige to any car, for the reason that there is no substitute that will give the effect and result that curled hair gives between springs and tapestry or leather. Trimmers choose to use the newer type of woven curled hair, which consists of loose curled hair fastened to burlap cut to dimensions. Most of the cushion and back plaits are filled with woven curled hair, and it is possible to fill them with loose curled hair if desired, irrespective of whether the body is trimmed in leather or cloth, and it is conceded that this class of trimming is long lived and gives the desired comfort of riding.

Many types of stuffing tools are being used both for woven and loose curled hair, the most common type for woven hair being a flat metal stuffer in two parts which clamps the hair between them. When plaits are filled with loose hair this same implement is used, except that both parts are rounded a little. When cloth trimming is used, a high grade hair must be used, and because of the filling quality of this grade of curled hair, only a small quantity is necessary to give the desired result.

Curled hair possesses the three fundamental virtues necessary to make a perfect upholstery filler, namely, soft contact, resilience and self ventilation, and for this reason vegetable and metal substances have never successfully displaced it.

*Manager curled hair department, Wilson & Co.

Many Benefits in Scientific Analysis of Truck Markets

One naturally would expect more efficient salesmanship and greater profits in sales in a well-studied territory, but the Packard plan which is here described has developed by-products that are especially interesting.

By N. J. Ocksreider*

UNDER the new conditions of business throughout this country, which call upon the manufacturer for production and selling on a far closer margin than has been required in the "sellers' market" of the last few years, there is nothing of greater importance than the elimination of guess work, both in selling and in production. This is nowhere more vital than with the motor truck. In spite of its many proven advantages and the great economies that it has brought about, it is not yet through the struggle necessary to establish itself firmly in the minds of many who should be buyers.

The truck market in the last few years has suffered intensely from the "by-guess and by-golly" system, both in selling and production. Some parts of America have been flooded—others have been starved. There has been very considerable waste all along the line. This has resulted in abnormal costs and frequent dissatisfaction and has had a powerful influence in producing the unfavorable conditions of the last few months. The elimination of these evils must be one of the first steps in putting the motor industry on a firm foundation for expansion under the conditions that we have just begun to meet.

Some time ago the Packard Motor Car Co. decided that it would pay to get the real facts about the market. A system has been worked out, after various experiments in restricted territories, and is now being generally supplied. It gives us at the beginning of each year full information on sales possibilities in each district. It is also kept up to date throughout the year and gives accurate control of the selling campaign from day to day.

Record of Trucks

Roughly speaking, we get from this system the number of trucks operating in each territory, the proportion of our own and of each competitor's trucks in the territory as a whole and in each line of business, the probable need of replacements for each truck owner, and the probable expansion in business. As a result of these things it is possible to make a very close estimate of the business that can be done in that territory in the ensuing twelve months.

The light that this system has thrown upon market conditions has been a surprise even to ourselves in many cases. It has shown over and over again how little we actually knew about any particular market and about the performance of the salesmen in it. It has revealed sales possibilities that were never suspected.

As an example, there may be cited a case in one of the big Eastern cities where three men were covering adjoining districts. On previous performance, two of these men could be considered stars—the third man

hardly even a good salesman. But the third man was outselling both of the others and it began to look as if they had slumped and he had developed sudden brilliance. When the market was analyzed, however, it was found how that, although the three territories were about the same in size and population, there were differences in commercial interests which made the third man's territory about a 400 per cent better market than either of the other two. It also showed that the man who had been making the high records was actually placing only about 4 per cent of the trucks that went into his territory, while the two men who seemed to have been "falling down" were, in fact, selling 20 per cent of all trucks placed in their territory. As a result of the analysis, one man took over the territory where two had been and two took the territory which the one had handled. Within three months sales in the districts involved had increased more than 50 per cent.

The advantages obtained from this system have already been great. It is being expanded rapidly, and successful experiments have been made and showed that an even more direct and detailed survey of territory will be valuable.

Our system in the majority of districts is based on the registration figures for trucks in that territory. In starting an analysis a card (Table "A") is made for each truck user in the territory, giving his address and

Newton Lumber Company 123 Sycamore St. Newark, N. J.					
Co.	Lic. No.	Motor No.	Make	Size	Year
Y	912439	20631	Competitor	2	1915
Y	812439	125007	Packard	3	1919
Newtown Chemical Company 765 Main St. Elizabeth, N. J.					
Co.	Lic. No.	M			
	823456				

Table A

his trade, also his classification, the make and size of all trucks that he uses and the date his vehicles were installed. The next step is the construction of a "TRUCK REGISTRATION MASTER TABLE" (Table "B"), showing in every trade the Packard standing in comparison with each of our competitors and with the total of the trade in that city.

In the larger territories we have found it worth while to list no competitors who had less than 50 trucks running, but in smaller territories it is often desirable to establish a minimum showing 25 or even 10 trucks. In

*Chief transportation engineer, Packard Motor Car Co.

TRUCK REGISTRATION MAS										
MAKE	Farms		Stores		Lumber		General Manufacturers		Building Materials	
	No.	%	No.	%	No.	%	No.	%	No.	%
Packard	2	6.4	12	1.3	7	5.6	17	10.5	13	3.9
1st Competitor	1	3.2					3	1.9		
2nd Competitor	6	19.3	69	7.7	4	3.2	1	.6	16	4.9
3rd Competitor										
4th Competitor	2	6.4	1	.1			4	2.5		
20th Competitor	2	6.4	46	5.1	1	.8	18	11.1	17	5.2
21st Competitor					1	.8	2	1.2	5	1.5
TOTALS	31		900		125		162		328	

Table B

MASTER TABLE										
BUSINESS	Chemicals		Metals		Totals—Each Make		No.	%	No.	%
	No.	%	No.	%	No.	%				
Packard	9.2	12.5	5.5	9	5.1	704	5.3			
1st Competitor					2	1.1	114	.9		
2nd Competitor	3.1	30	13.9	15	8.5	1099	8.2			
3rd Competitor	1	.5	1	.6		101	.7			
4th Competitor	0.7	2	.9	1	.6	80	.6			
20th Competitor	3.5	14	6.6	15	8.5	879	6.6			
21st Competitor	9	2	.9	1	.6	143	1.1			
TOTALS	215		175			13346				

TABLE OF COMPETITIVE INSTALLATION BY TRADES										
BUSINESS	Packard		1st Competitor		2nd Competitor		3rd Competitor		4th Competitor	
	Owners	Percent	Owners	Percent	Owners	Percent	Owners	Percent	Owners	Percent
Farms	2	10.5	6	31.6	1	5.3	4	21.0	1	5.3
Stores	3	7.9	4	10.6	4	10.6	4	10.6	13	34.2
Lumber	5	8.6	4	6.9	1	1.7	7	12.1	1	1.7
Gen'l Mfrs.	19	55.9	1	1.4	6	8.5	6	8.5	2	2.8
Bldg. M't'ls	9	5.9	11	7.2	13	8.5	15	7.9	6	3.9
Chemicals	8	7.6	24	22.8	12	11.4	14	13.3	4	3.8
Metals	5	5.2	12	12.5	6	6.3	11	11.5	5	5.2
TOTALS	368		624		364		305		246	

Table C

working from this table, inspection of the totals at the right shows immediately which competitors are the most active, and by running across the sheet it can be determined in which trades we are having the most success. The totals at the bottom of the table show those businesses which offer the best opportunities for the truck salesmen.

In making up this Master Table we have found it desirable to allow a total of 34 classifications, and of these groups several minor divisions are listed. The general classifications used are as follows:

- Automotive—Manufacturers and dealers.
- Artisans.
- Bakers—Manufacturers and dealers.
- Brewers and Bottlers—Manufacturers and dealers.
- Building Material—Producers and dealers.
- Chemicals—Manufacturers and dealers.
- Confectionery—Manufacturers and dealers.
- Contractors.
- Department and Small Retail Stores (Except exclusive food and furniture stores).
- Farms (Excluding dairies).
- Federal, State, County, City and Public Service Institutions.
- Feed and Cereal Products—Producers or dealers.
- Food, Prepared—Manufacturers and producers.
- Fuel—Producers and dealers.
- Furniture—Manufacturers and exclusive dealers.
- Grocers—Producers and dealers (except farms).
- Hotels and Amusements.
- Ice.
- Laundry and Dyers.
- Leather—Manufacturers and exclusive dealers.
- Lumber—Producers, manufacturers and dealers.
- Manufacturers, Machinery—Manufacturers and dealers.
- Manufacturers, Miscellaneous—Manufacturers and dealers.
- Marine.
- Meats—Producers and exclusive dealers (except farms).
- Metals.
- Milk and Milk Products—Producers and dealers (including farm).
- Paper and Printing—Producers and dealers.
- Passenger Transportation.
- Petroleum Producers, Refiners and distributors.
- Rubber—Producers and dealers.
- Textiles and Furs—Producers and wholesale dealers.
- Trucking.
- Unknown.

For convenience in checking through the selling campaign there is also made up a table of competitive installation by trades (Table "C"). In compiling this the most active competitors are selected from the Master

Table and it is then determined how many owners of vehicles each of these competitors has in each line of trade. This table shows those trades in which the most serious competition may be expected, because competitors have established a standing with a comparatively large number of the firms engaged in such trades.

As will be shown later, one of the most important functions of such an analysis is in making estimates for the next year's business, and for this purpose it is desirable to make a table showing the size of the fleets used in various lines of business (Table "D"). Finally, a statement showing the different size of trucks used in different territories is prepared (Table "E").

As an example of the concluding step in the opera-

Business	1 Truck	2 Trucks	3 Trucks	4 Trucks	5 or More Trucks	Total Owners
Farms	12	6	0	0	1	19
Stores	9	7	2	4	16	38
Lumber	34	6	10	1	7	58
Gen'l Mfrs.	40	13	8	2	7	70
Bldg. M't'ls	89	28	14	8	14	153

Chemicals	Metals	Totals
64	58	2872
24	23	784
7	8	373
3	3	189
9	4	393
107	98	4611

Table D

Statement for Territory Number Seven Truck Capacity in Tons										
Packard	1 1/2	2	3	4	5	6	7	Total		
1st Competitor	11	18	6	8	8	9	0	60	22	
2nd Competitor	4	3	3	1	0	0	0	11		
3rd Competitor	1	5	7	0	0	0	0	13		
4th Competitor	2	0	8	10	0	5	25	45		
5th Competitor	3	0	16	13	0	0	0	32		
6th Competitor	0	0	0	0	0	0	0	0		
7th Competitor	0	0	0	1	0	0	0	1		
8th Competitor	0	2	2	15	0	0	0	17		
9th Competitor	0	0	0	4	0	1	8	13		
10th Competitor	44	3	0	0	0	0	0	47		
Miscellaneous	38	40	17	38	20	0	0	153		
Total	103	71	50	88	35	6	362			
Total Number of Packard Trucks								34		
Packard Percentage								14%		

Table E

tion, the following summary is taken from a survey actually made in one of the medium-sized cities:

Truck Market Summary

	Capacity in Tons						Total Heavy	Total Light
	3/4	1 1/2	2	3	4	5		
Packard	510	518	324	159	368	3	1,372	510
First competitor	37	437	228	..	209	..	874	37
Second competitor	..	273	11	..	2	..	286	..
Third competitor	..	29	71	42	73	..	215	..
Fourth competitor	..	76	38	5	24	..	143	..
Fifth competitor	..	60	1	..	69	..	130	..
Sixth competitor	..	51	23	..	33	1	108	..
Seventh competitor	..	63	23	2	7	..	95	..
Miscellaneous	1,279	940	337	14	161	12	1,464	1,279
Total	1,826	2,447	1,056	222	946	16	4,687	1,826
Per cent sizes to total all makes	..	52.3	22.5	4.7	20.2	0.3		
Per cent sizes Packard	..	38.5	23.4	11.3	26.5	0.3		

Potential Market for 1921

Total trucks over ¾-ton.....	4,687
Total Packard.....	1,372
Per cent Packard representation.....	29.2%
Annual replacement of all makes at 25%.....	1,171
New owners.....at 10%.....	469
Additional equipment.....at 15%.....	704
50%.....	2,344

Assuming that Packard will maintain its present per cent of representation, the allotment for 1921 should be 29.2 per cent of 2344, or 684 Packards.

From the table above the allotment by sizes should be:

38.5% are 1½-2 ton or	261
23.4% are 3 ton or	166
11.3% are 4 ton or	76
26.5% are 5 ton or	180
.3% are 6 ton or	1
100.0%.....	684 Total

On this basis, allowing for no increase in business, the allotment for 1921 should be:

261 Size EC Packard
242 Size ED Packard
181 Size EF Packard
684 Total

Even this analysis, valuable as it is, has not seemed to us sufficiently complete, and we have been experimenting in one large market territory with a system even more intensive. This system has covered an entire State and has proven of such value that it is now being rapidly extended.

This second plan differs from the analysis based on registration in the fact that a direct house-to-house canvass is made to discover possible purchasers of motor trucks, whether or not they are now operating any. Canvassers cover both city and country, and by inquiry and personal conversation get the desired information. They frankly explain their mission and usually have no trouble in obtaining the facts desired. They make no effort to sell, but turn the reports over to the Sales Department, which handles prospects in the routine way.

In making this survey an area with a population of about 700,000 was divided into 15 districts and an analysis man was assigned to each district. At present about one salesman is used for every two analysis men and the salesmen's records show that they have great ease in marketing, due to the information they have on hand before they approach a prospect.

The information turned in is listed and handled by the same methods as are used for the registration survey.

As a result of this market analysis the chief advantages that have been gained on the selling end have been as follows:

First: The analysis makes possible a far more intelligent assignment of territory to salesmen, as in the case already cited. We have found some salesmen who had four or five times as many prospects as they could handle, others with too few to keep them busy. The analysis has resulted in far more efficient work from both classes.

Second: Our list of prospects is far more accurate and alive. We know quite definitely what men are, or should be, in the market, and we know exactly who in each territory should receive literature on any particular point.

Third: Learning the comparative value of different trades as markets. We have found that there are some trades which, from the nature of their business, have comparatively little use for the particular types of vehicles which we produce. We find that there are other trades for which our prod-

ucts are particularly useful. In several cases where we found that we were making no progress in certain trades we have been able, by a study of that trade, to develop special types which have not been previously used and which have been of great value.

Fourth: Keeping our mailing list thoroughly up to date and thoroughly alive. Working from accurate knowledge, we can carry on sales promotion that is effective without being overburdened.

The advantages of knowing territories in which different makes of trucks dominate are obvious and need not be enlarged upon. The advantages of being able to apportion direct-by-mail and other overhead expenses on the basis of business that will actually be done, instead of on the basis of rough estimates, is also obvious. Excessive guesses as to possible sales invariably lead to excessive expenditures for handling those sales.

Balance of Men and Prospects

In the same line comes the advantage of having our selling organization in each territory properly adjusted to possible sales in that territory. We know very closely how many salesmen can profitably be employed, how large an office staff will be required to support them, how much should be spent on advertising, on mail campaigns and on other adjuncts. This information makes it possible to unify and balance the entire organization.

An incidental advantage, but one of considerable importance when it was considered that trade-ins are involved in nearly half of the sales, comes from knowing market possibilities of second-hand trucks. Our lists show who in our territory are using each of the competitive makes of trucks and, therefore, give us a very definite knowledge which enables us to place vehicles of those makes with a minimum sales effort.

One of the greatest advantages that has come to us from this system is accurate knowledge of our strength compared with that of our various competitors in each trade field. In the fields where our competitors have succeeded in taking the lead this is particularly valuable. The analysis covers situations of this kind and shows us when it is desirable to take vigorous steps to meet a particular competition and how to properly direct our campaign.

The Neglected Fields

A recent example of this occurred in a city which had been considered a highly successful territory. The full quota allotted to that city was being absorbed steadily and without effort, and it had been very difficult to make the men there see that any advantage could come from a market analysis.

But when the analysis was completed it showed that there were 14 per cent of the trades in that city in which our products would have been useful, but to which we had not sold a single unit. It showed, also, that 60 per cent of all our units operating in that city were in a single trade. The advantage in almost every other line of business was held by the same one of our competitors. It was obvious that the salesmen had found a line of least resistance in the one trade where they were strongest and had been overplaying that part of the market. Special efforts were immediately directed toward other trades, with the result that during last summer and fall, while sales of all our competitors were falling off, we increased our sales between 15 and 20 per cent above normal and reversed our position in several lines of business.

The Production Advantage

From the production point of view the information received from accurate market analysis is equally valu-

able. About the most expensive of evils in manufacture is guesswork. A bad guess in regard to the amount of product that will be needed, whether it is too low or too high, greatly increases all the cost of production. If the guess is too high, then the end of the fiscal year will find overstocked inventories and seriously unbalanced shop operation. If the guess is too low, there will be a definite loss of sales and a very considerable expense involved in trying to scrape up materials and speed production to meet the unexpected demands.

Of course, a perfect production schedule is impossible. Many unexpected factors are sure to come in to alter any schedule laid down in advance. But the more nearly we can come to the actual facts the smaller the evils will be and the greater will be the reduction in cost and price that can be effected.

Although the cost of these evils falls on the production department, the evils themselves are directly due to the sales force, since it is the sales manager who has to lay down figures for the production. The usual method of reaching production schedules by stewing out a series of guesses from all parts of the selling field does not need discussion. The thing that has surprised us was to find out how great the errors were in these guesses.

Cost of Undue Optimism

There was one of our distribution points, for example, which estimated that it would sell 125 trucks during 1920. From the first it fell steadily behind its expectations, and an analysis of the market was ordered. This showed that in the city the company was selling about 10 per cent of all the trucks being placed and that up to 1920 it had sold a total of only 120 trucks. Our potential market, on the basis of the analysis, was only for from 60 to 65 trucks. The distributor had, in effect, by asking us to produce 125 trucks, demanded that we should produce a surplussage of 60 unsalable trucks, costing us, roughly, \$200,000.

Of course, such serious errors are not frequent, but the error in estimates is almost always on the side of overproduction. There are also errors just as serious in regard to the type of truck that will be demanded, and these have an almost equally bad effect on the production situation. Taking these factors together it is safe to say that under the old guesswork system the variation from the actual needs ran from 50 per cent to as high as 100 per cent. The effect on the finances of a company which produces 50 per cent more goods than it can sell would, of course, be disastrous. But the general dislocation of production machinery that is sure to result when these excesses have to be corrected is extremely serious. Under the market analysis system there are, of course, still errors varying from 10 per cent to as high as 33 per cent—the difference is from 40 per cent to 66 per cent, an average increased accuracy of about 50 per cent.

What this saving amounts to in cash can be figured out roughly, and it runs close to 10 per cent of the actual cost of production. Saving on inventories, for instance, runs all along the line from the moment the outside purchases of all kinds enter the plant. It is a rough general rule that in manufacturing plants the total value of inventories is something over one-third of the annual turn over. When this is true the interest tied up in these inventories amounts to 2 per cent of the turn over. On this basis the loss on the one item of interest paid on the capital tied up in inventories, is equal to about one-fifth of the total profits. The reduction of inventories, of course, is only one of many obvious savings.

These are the advantages that have come from the system of market analysis based on registration of trucks, which is the one generally used. There have

been certain additional advantages from the more intensive method prescribed. The chief of these is in more complete listing of prospects and selling, but this is only one of several.

The detail survey plan, for one thing, has brought in a great deal of information in regard to prospects for cars as well as for trucks. It has also proven a splendid training school for salesmen, so much so that the salesmanager in charge of this territory declares that as a source of material to fill selling positions, the plan has been worth everything it has cost. The system also results in opening new territory and putting trucks into parts of the country where they had never been used before. The analysis men keep in touch with all work that is going on, such as road and sewer construction, and from them we learn the prospects and have our salesmen at work even before the contracts are awarded. Finally, analysis men are educating farmers and business men who have always used horses or competing trucks. They are teaching them the fundamentals of value of transportation engineering which is nothing more or less than scientific truck selling.

In keeping in touch with the situation it has been found desirable to use a map showing graphically sales conditions in the territory. Installations of trucks are posted by means of pins which are colored to represent makes of our leading competitors. Where there are too many trucks in a given territory to make it impossible to put in a pin for each vehicle, a tack is used, on the head of which is written the name of the vehicles. From this map the sales manager can see at a glance the various kinds of trucks in the different parts of the territory. He can detect any change in conditions from day to day and see that special attention is directed where it is needed.

The advantages of this system in the period of vigorous competition and sales effort upon which we are entering can hardly be over-stated. They have been so great that the extension of the system to cover the entire country is inevitable. The cost has proven very small in comparison with the increased sales, increased earnings and decreased cost, both for selling and manufacture.

Less Gasoline from Natural Gas

DR. R. P. ANDERSON, chief chemist of the United Natural Gas Co., who spoke some time ago before the Western New York Section of the American Chemical Society on natural gas and the natural gas-gasoline industry, brought to light the interesting fact that the probable decrease of natural gas-gasoline during the next year or two will be felt in the gasoline industry, because natural gas-gasoline is a volatile constituent of many commercial gasoline mixtures. By the use of the highly volatile natural gas-gasoline, it is possible to make use of the gasolines of low volatility in even cold weather. The failure of natural gas through Ohio and Pennsylvania, which are the two leading natural gas States, is naturally going to have a similar effect on the natural gas-gasoline industry.

Dr. Anderson also pointed out the increasing use of the absorption methods of manufacturing natural gas-gasoline. This, he stated, is a result of experiments during the war on the high absorption qualities of charcoal. This development is going ahead very rapidly and plants using it are running at 50 to 75 per cent efficiency, which is higher than by previous methods. It is also found possible by this method to extract the gasoline from natural gases which are very lean in gasoline and from which it is practically impossible to get results with the compression method which was previously used.

Conditions in Bulgaria Favorable to the Tractor

In this interesting article the writer makes very clear the need of long term credits if we are to sell our products in the war worn countries of Europe. Here is a country that needs tractors, but cannot buy them.

A. M. Gheorghiew*

BULGARIA is essentially an agricultural country. Eighty-two per cent of her population are peasants and the economic life of this country depends in the first place on its crop. In spite of this the methods of cultivating land are relatively primitive and the use of modern machines is limited. The causes of this unfavorable situation are of different kinds. The short period since the liberation of the country from the Turks (1878), whose régime always paralyzed any development of productive forces; the division of the land into small parcels, resulting in the insufficient purchasing power of the farmers and the difficulties in using machines in a profitable way on such limited areas; the lack of technicians and adequate workshops.

Change in the Situation

Nowadays conditions are changing in many respects. Owing to the almost uninterrupted wars since 1912 to 1918, the country is economically exhausted; we need to increase production to the utmost and, conforming to our conditions, firstly by speeding up our agricultural activity, in order to cover our liabilities and to rehabilitate our finances. On the other hand, during the war a big percentage of our cattle was lost and must be replaced in some way. Our farmers already understand, that our ground, being fertile, requires intensive working. Lastly, the lack of transport facilities outside the railroads handicaps the development of export, especially of cereals. All these requirements could be satisfied by introducing on a larger scale up-to-date and proper agricultural machines, tractors and also trucks.

In the present article we shall consider only one of the most important machines of modern agriculture viz, the motor-plough. Bulgaria is now just entering the phase of "industrializing" her agriculture, a situation which has been experienced by more advanced countries many years ago. As we have already mentioned, there are serious hindrances in the way of modernization of agricultural methods, but the necessity of efficient machines is so evident that all obstacles will be overcome. It is also of importance that our present government created by the "Agrarian party" is paying particular attention to the strengthening of our farming activity.

Trials and Their Results

The first serious trials with motor plows were made in our country during the last war, especially on the Dobroudja, called the "gold" country and "granary" of Bulgaria. The results were excellent. Unfortunately, Dobroudja with its vast and fertile plains, highly suitable for motor plowing, no longer belongs to this country, as a result of the peace treaty. However, we have

still important districts where motor plows could be utilized successfully. The principal point is to proceed systematically, to supply the farmers with the best types of machines for this country and to show them how to extract the largest profit from them. With this object in view, our government arranged in August last, in the neighborhood of Sofia, the first systematic trial of motor plows.

The following firms were represented there: Case, 10/18 hp., plow with three shares and 15/27 hp., plow with four shares; Fiat, Romeo, 24 hp.; Moline; Frick, 25 hp., plow with three shares and Traga, 40 hp., plow with five shares.

In these trials the Case tractor gave the best results, the second place being taken by a Fiat. The opinion of both the expert commission and the Director of the Agricultural Bank, who was president of the commission and with whom I had the chance to have an interview, could be summarized in the following statement.

1. In view of the particular working conditions in this country, tractors of medium power with plows of 2-3 shares are the most suitable.
 2. The tractor system with detachable plow is preferable to the rigid one.
 3. Apart from plowing, the tractor must be suitable for the transport of goods, driving of threshing machines, pumps, etc.
 4. The consumption of fuel must be reduced to the lowest possible (very important), taking into consideration the extremely high prices of petrol, etc. (chiefly due to the depreciation of our money; the price of a litre of benzine rose from 0.35 Leva in pre-war time to the fantastic figure of 14 Leva). A more expensive machine with reduced consumption will be in general preferred to a cheaper one, which wastes fuel.
 5. The carbureter must be adapted for benzine, benzol and kerosene.
 6. The whole machine must be suitable for plowing in a rough country.
 7. Two types of shares to each motor plow—one for heavy and the other for medium and light ground—are desirable.
 8. In view of the lack of technicians, the construction, and especially the operating of the machine, must be simplified to the utmost.
- In order to obtain the most efficient use of the motor plow, and for its rapid introduction, it will be also advisable to carry out the following suggestions:
- a. Facilitate repairs in well-organized workshops, distributed in the most important centers of agriculture.
 - b. Provide a technical control by means of traveling mechanics.

*Mr. Gheorghiew is connected with government promotion of automotive equipment in Bulgaria.

c. Secure fuel and lubricating oils of good quality at reasonable prices.

d. Propaganda accompanied by demonstrations.

The best way for meeting the above mentioned suggestions will be, apart from the co-operation of the government institutions, the establishment of agencies of important manufacturers in Bulgaria.

After the trial in the past year the general opinion was that the introduction of motor plows in this country would give the best results. But the rate of exchange being greatly against us (the nominal value of the dollar is 5.25 Leva and during last year it rose on the average to 80 Leva), the prices of the machines and the fuel were too high and, therefore, motor plowing seemed to be, however, not profitable. Thus, the purchase of motor plows was postponed. But as the exchange remains still in the same state and the need of the machines in question for our farms is acute, the government decided to repeat the trial in May this year and then to start modernizing farming in our country.

The conditions in the judging of the motor plows will be almost the same as at the preceding trial. The strength and the suitability of the construction, the efficiency of the machine, working cost, quality and quantity of the work, repair facilities secured by the firms, will be of first importance.

The depth of the furrows will vary from 8 to 24 cm. when working on a gradient of 7 per cent, the required depth will be 17 cm. It deserves to be mentioned that the results of the trial, as was the case last year, depend, in a great degree, on the skill of the mechanics. It seems that the next trial will be organized on a larger scale and that more firms will compete.

Suggestions and Conclusion

As we have already stated, all the difficulties of a technical and financial nature in popularizing and extending the use of motor plows will be overcome by the necessity of increasing production by improved farming methods. This opinion will be endorsed, especially when one bears in mind that the general state of education in Bulgaria is very good. There are almost no illiterate people in Bulgaria so that the utility of the machines is rapidly understood by all the classes of the population. But manufacturers and dealers interested in this line could considerably facilitate and expedite the industrializing of Bulgarian agri-

culture both to the profit of the country and to their own advantage.

Besides the technical facilities needed for that purpose, it would be of great importance to hasten this process also from the financial standpoint. It is true that as a consequence of the war, the purchasing power of the farmer increased considerably in comparison with that of the citizens.

But, on the other hand, the depreciation of our money hampers the sale of foreign articles in the Bulgarian market.

The credits granted to our farmers by manufacturers of agricultural machines had, as a result, the remarkable increase of orders for such machines during the last years before the outbreak of the war. Such credits are now still more required (because of the unfavorable rate of exchange) in order to enable the farmers to acquire machines. On the other hand, the Bulgarian peasant and citizen were known in the Balkans as good payers, so that no risk would be faced, when allowing such credits, if conducted in the proper way.

Finally, we should emphasize that the Bulgarian market could play a much more important rôle in the near future than could be expected of it in proportion to its limited area. The nearness of Bulgaria to Southern Russia—this enormous field for agriculture, which, in normal times, feeds the great empire and in addition to that exports large quantities of cereals—could favor, firstly, the organization of the supply of machines to Russia (when she will open) and, secondly, would allow her to make use of Bulgaria as a big trial field for farming machines destined for Russian markets. Before the war (and undoubtedly some time later again) many Bulgarian peasants used to go to the Southern Russian districts for temporary work and they were there received always in the best manner as good agriculturists. Those people are also capable of facilitating the introduction of such machines in Russia as proved to be adequate in the Balkans. And it is doubtless that, when Russia recovers, its market will be of extreme importance for the exporters and in the first place for those interested in the agricultural machinery and implements.

We hope that the facts pointed out in this article will serve to awaken the interest of the makers engaged in the manufacture of agricultural machines to the attractive prospects of this country.

Trucks Used in Warehouse Industry

THE warehouse and transfer industries offer a lucrative field for the sale of motor trucks. *Distribution & Warehousing*, the business paper of the warehousing interests, recently compiled information for incorporation into its 1921 Warehouse Directory and in the questionnaire which was circulated there was included an inquiry as to the use of motor trucks and horses in the distribution of manufacturers' products and in the transport of household goods. The responses indicated that the horse is being retired from warehousing and that the motor truck is generally favored.

The direct inquiry about teaming facilities was answered by 1064 warehouse and transfer companies. Every one of the transfer interests operates one or more warehouses.

This tabulation shows an average of nearly six trucks to a company. The inquiry as to teaming service was left unanswered by many of warehouse companies which are employing the commercial vehicle, but the tabulation is definite in its indication of the field that is there for the truck manufacturer.

The replies from these 1064 companies supplied the following statistics:

Tons Capacity	Number in use
1	952
1½	416
2	1343
2½	484
3	387
3½-5	716
Above 5	479
Unclassified	1272
Total	6249

Some warehouses are operating fleets which run as high as fifty or sixty trucks. These are used for distributing shippers' spot stocks held in the storage plants or goods which have arrived in carload lots. Some of this distribution is carried on in zones which extend several hundred miles from the warehouse.

In the 6249 trucks there were 176 different makes represented.

Why Southern Ports Cannot Compete for Export Shipments

Financial arrangements, say the practical men, are of more importance than the saving of freight costs by using the shorter and more direct route. Experience shows that rail shipments are preferred to water when rails reach the destination.

By H. H. Dunn*

THE fact that virtually all automobiles manufactured in the United States and sold in foreign countries are so sold to be paid for with drafts on New York, sent with the bills of lading, has practically eliminated the gulf ports as points of export for either passenger cars, trucks or tractors. During the period of freight congestion in New York, a few months ago, a number of Wichita trucks were shipped through New Orleans to India, being handled down the Mississippi on barges, and transshipped here, while about 100 Dodge, Ford and Hudson passenger cars were sent through New Orleans to Latin-America, but as soon as the congestion was relieved at New York these shipments stopped and no further shipments were made.

While shipment of automobiles and trucks from the factories in the upper Mississippi Valley, by the all-water route to New Orleans, and thence on steamer, especially to Latin-America and the Orient, is somewhat cheaper as regards freight costs than the shipment by rail to New York, with the added distance from that port to the Panama Canal, lack of suitable financial arrangements at Gulf Coast ports more than offsets this freight saving.

The majority of the automobile manufacturers of the United States maintain export departments or agencies in New York, and have no such departments on the Gulf Coast. The actual technical business of exporting, arrangements for packing and crating, and for short-time payment for exported cars and trucks, are thus far more easily carried on from New York, and until such departments are established in New Orleans, Mobile, Galveston, Houston, or other Gulf Coast ports, there is little prospect of automobile export traffic worth mentioning from any of these ports.

Recently the company which manufactures the Ranger car in Texas shipped a number of its cars to Mexico City dealers. Despite the fact that this company is located in Houston, and that Houston is virtually a deep-sea port, the cars in this consignment were shipped by train to the border and thence over the National Railways of Mexico to Mexico City and other points of distribution in the southern republic. This would indicate that, in addition to lack of financial and other shipping conveniences at gulf coast ports, automobile shipments by train are more satisfactory than by steamship.

These are the opinions of the shipping men and steamship agents of New Orleans, as voiced by A. N. Floyd, general manager of the New Orleans and South American Steamship Co., one of the principal lines operating into the ports of Latin-America, and connecting with Pacific

Mail and other steamers on the western side of the Isthmus of Panama.

"We have tried, and other steamship companies and agencies in Gulf Coast ports have tried, to lay the foundations for an automobile export business from these southern ports," said Floyd, "but so far we have been unable to do so. We sent trained men into the automobile manufacturing centers through the upper Mississippi and Ohio valleys and around the Great Lakes, but we found that financial and shipping arrangements were so much better through New York that we could not compete with the north Atlantic port, at least until we had similar arrangements as to export departments and financing in the southern ports.

"All automobiles sent by sea have to be crated, costing approximately \$100 for each car. The trucks and other cars shipped through New Orleans during the period of freight congestion in New York some months ago were sent unpacked to New Orleans, crated here, and then placed on board the ships.

"While the rate by barge line down the Mississippi River, from St. Louis to New Orleans, is some 20 per cent cheaper than the rail rate, the manufacturers seem to find that rail shipments to New York are more satisfactory than by water southward to these ports. Whatever the cause for this, there is little prospect of increased automobile export business from any of the Gulf of Mexico ports of the United States until payment can be made by drafts on bills of lading through the banks of these ports, and until export departments of the various automobile manufactories are established here."

The automobile dealers, and distributors, some of whom have tried, in a limited way, to export a few cars to Latin-America, hold the same opinions as the shipping men, but go somewhat further in their discussion of reasons for the lack of such exports.

"There is no use in attempting to export cars or trucks from the gulf ports," said one distributor, "until the gulf ports wake up to this great industry and are willing to operate 'fifty-fifty' with the would-be exporter of automobiles, the way the banks in New York do. If we handle cars out of here to any Latin-American country, instead of getting paid with New Orleans, or Mobile, or Galveston drafts, we have to take New York drafts on our bills of lading. This slows up the deal and inconveniences the New Orleans exporter.

"Then, too, the business of exporting automobiles, trucks or tractors to Latin-America is precarious because of the lack of facilities for making collections through New Orleans banks. Most of the dealers and distributors of automobiles in Latin-America, unless they are American

*Class Journal correspondent at New Orleans.

or British firms, want all the time they can get, and they figure on 30, 60, 90, or 180 days from date as exclusive of the time required for the automobile shipment to travel from the point of shipment to them, and as exclusive of the time required by their remittance to come from their city to New Orleans. In cases where such time amounts to 15 to 30 days each way, as it does between the gulf ports and some of the cities on the west coast of South Africa, or in the interior of Mexico or Central America, this is a serious matter. More frequently than not, the local exporter has to put up his own money for from 30 to 60 days, no matter how good the Latin-American firm may be or how promptly it may remit.

"If we had branches of the export departments of some of the automobile and truck manufacturers here in New Orleans, or even in Galveston, Houston, Mobile, or some other of the gulf ports, or if we had foreign bank connections here which would handle the paper of these Latin-American buyers, we might do some business, but as matters stand, I'm off the auto export end of it for life."

Still another dealer, who operates in New Orleans on larger capital than most dealers, and who has been able to

swing some export deals through the use of his own money, talked along another line about the matter of exports from the gulf ports. Said he:

"I doubt if the shipment of passenger cars by boat to Latin-America ever will be as successful as their shipment by rail. Every day a car stays on the water damages it; there is no question about it, and I have had to knock many a hundred dollars off the price of cars I have sold in Latin-America because of rust and other damage from the salt water and salt air. This is especially true when shipments are made far south on the east coast of South America, or when they are made to almost any point on the west coast of that continent, involving trans-shipment at Panama.

"Experience has taught me that it is impossible to so crate or pack an automobile, whether entire or 'in the flat,' to protect it from the effects of this dampness, and, to be perfectly frank with you, I should like to have seen those trucks which were shipped through New Orleans to India a few months ago, though, naturally, the heavier and coarser metal of the truck or the tractor suffers less from this corroding salt air than does the finer passenger car."

A Removable Track for Rubber Tired Road Vehicles

THE present development of army combat transportation requires cross-country vehicles which are also able to travel on good roads at the speed of conventional motor trucks. Previous forms of caterpillar tracks were usually developed for low-speed agricultural purposes, and high speeds were difficult to maintain, due to the wear and the mechanical losses in the track itself. Increased efficiency is attributed to the fabric track illustrated. Running on its wheels, the car can make about 45 miles per hour. With the tracks applied, a maximum speed of 37 miles per hour on good roads has been attained, which, so far as is known, is the highest speed ever developed by a track-laying type of vehicle.

Each track consists of two rubberized fabric belts which are connected together by steel stampings riveted to the belts, the ends of the stampings being turned over to the inside so as to form a guide into which the tires fit. Any clogging material which may lodge on the upper side of the track is forced through the large opening in the track, which is a feature of this type of construction.



Ford Runabout Equipped with the Chase Track

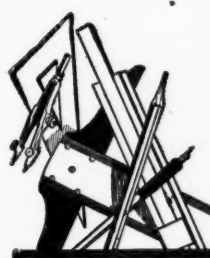
In addition to the regular wheels of the car, there are provided four extra wheels, two on each side, of the same size as the regular wheels and located between the front and rear regular wheels. These extra wheels serve as carriers, the track under the regular wheels being normally off the ground. Standard regular 3½-in. pneumatic tires are used, and after 1300 miles of operation, under conditions which would have damaged the tires of a regular Ford, the tires and fabric track showed no wear. There was a nominal amount of wear on the replaceable steel cross links.

For steering, a pair of separate brakes is provided which permit of locking the driving wheel on either side. The regular gear ratios of the Ford are too high for this vehicle to operate satisfactorily in soft ground, deep mud, wet marsh, etc., and a commercial auxiliary transmission, which doubles the gear reduction, is introduced in the drive shaft directly in front of the rear axle housing. For operation on improved roads, the regular Ford ratios are used. For cross-country running, the lower set of ratios is used.

In the accompanying photograph a Ford car is seen equipped with the removable tracks to adapt it for use on deep snow, "bottomless" roads, plowed ground, etc. The track was developed for the Tank, Tractor and Trailer Division of the Ordnance Department by A. M. Chase, who is in charge of its Syracuse engineering office.

Belgian Exports and Imports for 1920

Country of Destination or Origin	Belgian Exports		Belgian Imports	
	Cars	Chassis	Cars	Chassis
Germany	7	20	466	62
United States	4	3	1,380	136
France	95	62	1,061	586
Great Britain	352	256	120	38
Italy	2	7	235	234
Spain	127
Holland	225	...	55	...
Portugal	134
Other countries	253	191	87	8
Totals	1,199	539	3,404	1,064



The FORUM



Tire Pressures as Affecting Car Life

Editor AUTOMOTIVE INDUSTRIES:

The following paragraphs in the February number of *The Automobile Engineer* attracted my attention:

"Although under-inflation of tires is in direct opposition to the most explicit instructions issued by the tire manufacturers, there is little doubt that harmful results are confined almost entirely to the tires of heavier cars, and the tires of lighter vehicles do not evidence the rapid depreciation threatened by tire makers. In any case, it is better that the tires should be damaged rather than that the chassis and components should suffer.

"Apart from the usefulness of the flat tire on demonstration cars, those who have driven cars with relatively under-inflated tires would on no account return to the old practice of running their tires at catalogue pressures. The point of road contact being the place where the shock commences, it is evidently the correct place to absorb any but the largest movements, and the contact spot on the tire, with its minimum inertia, is particularly suitable for this purpose. If tires as now produced are not manufactured to resist this continued flexing, then there is need of further development."

This is a subject I have talked about a great deal and which I believe is worthy of consideration.

Of course, I do not believe in carrying tire pressures ridiculously low, but at the same time I feel that the tire pressures at present recommended by the tire manufacturers are entirely too high. They may save on tires somewhat, but I believe that they do more damage to the car, and decrease the riding comfort so much that the extra tire mileage to be gained is not worth while.

On experimental cars, when we want to abuse them, we pump the tires up real hard, and when we want to ride with comfort, and travel for pleasure, we deflate them to 50 lb. pressure for a 32 x 4 cord tire.

I have seen owner's cars come into our service department that have been pumped up so hard as to give the impression of riding on solid tires. Give a man a set of tires inflated to the tire manufacturer's recommendation, and then put him on the average macadamized or paved road, in its usual run down condition, and he is pretty sure to find himself in the repair shop in a very short time.

RUSSELL BEGG,
Jordan Motor Co.

Suggestion to Bus Builders

Editor AUTOMOTIVE INDUSTRIES:

Having occasion to ride in various motor omnibuses of either the front-entrance type or such as have no open rear platform, I have almost invariably been conscious of a strong odor of exhaust gas, particularly in the after part of the body. Due to the peculiarities of the air currents about the moving vehicle, such gas enters the body chiefly at the back and somewhat through the floor, the sides being swept by fresh air.

Since this gas is lethal, I believe it should be obligatory

on those who outfit buses to render them gasproof, even to the extent of sealing the floors and backs airtight; further, the chassis builders should pipe the exhaust to a point whence it will not be swirled along in the wake of the machine.

The next step, of course, is for the engine and carbureter makers so to adapt their products to the fuel as to secure more complete combustion with less noxious residue; but this will take time and cannot be counted on as an immediate palliative of the poisonous conditions in buses.

It would be a unique achievement if bus makers and owners both could take gas-exclusion measures on their own initiative before statutes and local ordinances compel them to; certainly, these considerations should not be overlooked.

KEITH ROLLIN MANVILLE.

Hempstead, N. Y.

Swash-Plate (Inclined Disk) and Z-crank Engines

Editor AUTOMOTIVE INDUSTRIES:

IT seems that at present a great deal of labor and money are being spent on the construction of engines, in which no ordinary crankshaft is used, but an inclined disk, fixed to a shaft, or a Z-crank with wobbling member.

This type of engine seems especially fitted for very high speeds, and may be designed to give very attractive engines. However, there is a hidden difficulty, and one so serious that these engines don't seem to have any future. As this difficulty may well escape even the attention of a thorough designer, and in most cases will only appear during tests of the completed engine, and as writer has himself for years been connected with the manufacture of such an engine, he thinks it useful to all who are planning in this direction to call attention to this difficulty.

To prevent the member, to which the connecting rods are attached, from turning, it is connected to the engine frame by some kind of universal joint. This results in the necessity for this member to perform very quick oscillations; as the frame does not revolve, and the axis of the wobbling member constantly changes its direction, it may be easily seen that because of the well-known periodical speed fluctuations of a universal joint, the wobbling member itself will slightly oscillate around its own axis. For each revolution of the engine the wobbling member oscillates two times to and fro. Though the oscillations are very small, in most cases only a few tenths of an inch, the forces which come into play are excessively high on account of the enormous speeds, and rather big inertia.

The problem of the construction of these engines is hidden in the construction of a universal joint which will transmit motion absolutely uniformly.

H. C. O.

THE Geological Survey Branch of the Canadian Department of Mines reports that the oil fields of northern Canada comprise 300,000 square miles.

Uses and Abuses of Organization and Associations

We have organized ourselves into a confusion of effort that is likely to retard the adjustment of our own knowledge. Mr. Tipper commends an organization recently established for purposes of research, but points out the excess of organizations devoted to the development of systems.

By Harry Tipper

IN the March 31 issue of AUTOMOTIVE INDUSTRIES I wrote an article entitled "Standardization Without Understanding Is Harmful," and in the fore part of that article I quoted from the New York "Times" concerning a meeting sponsored by Mr. G. K. Parsons, which was apparently called for the purpose of standardizing methods of selecting individuals.

Since that time Mr. Parsons has brought the matter to my attention and explained the plan of the committee. The plan as it has been started is different from the report in the "Times," and it is evident that the account which was printed failed to secure the right attitude as to the proposals.

The committee was called for the purpose of considering all the different methods for selecting men adopted by various concerns and organizations, and attempting to evaluate these methods by research and experiment. The idea of the committee is to find out what elements of value there are in each of the methods adopted and suggest the use of the things which have been found of fundamental importance and the elimination of those things which cannot be considered in that light.

This purpose is a worthy one, and one which can be of benefit in connection with a study of humanity in industry. Glaring errors in our present methods may be determined by a series of researches along these lines, and whatever is done in this direction will be on the lines of progress.

The difficulties which face such a committee are very great. In order to evaluate there must be a basis of appraisal, and our knowledge of human qualities, variations and necessities is very meagre. The most difficult part of a work of this kind will be the discovery of any basis upon which the valuation can be determined, and it will be unfortunate if the weight of organized opinion approves a method without a careful determination of the basis upon which that method is valued. However, the object of the committee is worthy, and it is interesting to discover an organization which is gathered together for the purpose of research rather than standardization.

This reference to organization reminds me that papers concerning three new organizations, having to do with the human side of industry, have passed across my desk this week. The number was sufficiently interesting to induce me to trace previous records of such organizations. At least thirty have been formed in the last year, and at the present rate of progress they will reach over a hundred in a very short time.

This craze for organization is leading to such a multiplicity in the organized work connected with co-operation, management, employment, personnel, industrial relations, human engineering, so called, and other elements of the human side of industry that the present confusion of mind is likely to be greatly enlarged by these endeavors.

We have considered organized effort as so vital a part of research experiment and propaganda that every idea, every method and every suggestion must be made the object of a committee, a conference or an association with its formal organization and its formal methods of examination and development. In the belief that organization as such is necessary to progress, we have organized ourselves into a confusion of effort that is likely to retard the adjustment of our own knowledge. In reality this is another visible symptom of the way in which we have depended upon system and systematized work to take the place of understanding and thorough definition.

The functions of these organizations interested in the human developments of industry are very much alike, none of them covering the field basically, and most of them devoted to the development of systems and methods rather than of examination and research. Committees, associations and conferences are excellent organizations for the purpose of arriving at agreements upon known facts, standardizing known practices and developing orderly methods. They have not proved themselves of value in research and they are not likely to be of much service in this respect.

It is not in the number of authorities who may discuss a subject that new principles are discovered, but in the patient research of some man who is willing to devote his life to the development.

Discoveries and improvements in the mechanical arts have not been due to the efforts of committees or associations; they have been the result of individual research in each case. When the discoveries have been made and the basic elements of practice established, the organized bodies have been of great value in standardizing and developing the operations by which these discoveries could become valuable to the general public. There is no reason to suppose that the methods of advancement will be any different in our progress in the human side of industry. In fact, our ignorance of the matter, the meagre amount of knowledge we possess and the large amount of conjecture in our method make it unlikely

that organized bodies can be of any great value in the development of our knowledge upon these subjects.

Very few men in industry, even among those who are especially interested in the human side, have studied deeply the fundamentals of human necessity, progress and reaction. The work of these men is not likely to be forwarded by the actions of organized groups composed largely of men who are versed in methods of examination, but have not studied the fundamentals upon which those methods should be based.

We have so much machinery of co-operative organization that it has become unwieldy and cumbersome. The objects of our organized effort are but poorly defined, and in many organizations few of the members have a clear idea as to where they are going or what they are attempting to do.

Co-operative organization presupposes a co-operative object and method. In discussions with the officers and secretaries of many organizations it is impossible to discover any well-defined reason for their existence or any well-defined method for their development.

One good organization with a clearly defined object in front of it and with a definite method of development would be worth a dozen of the present organizations and of more value to business.

In the meantime it is well to remember that conclusions of an organization as to the validity of present methods and their use are the result of the average

intellect in such an organization, and cannot be in accordance with the best practice of the most advanced students.

The man of sound knowledge and wide experience is ahead of any organization in the development of his practice. The value and purpose of the organization is limited to a comparison of individual methods and the general dissemination of those methods, so that all interested men may be able to avail themselves of the studies. So long as they are limited to discussion for the purpose of clearing the individual experience and practice, they have great value in enabling each practitioner to enlarge the horizon of his practice. So long as they are content to organize the known factors and to recommend methods valued upon known bases, they have their place in the industrial necessity.

Unfortunately, on the human side of industry, methods have been standardized without a proper knowledge of the fundamental bases, practice has been organized without the proper examination of its objects and purposes, and the present actions have tended to solidify the errors in the endeavor to standardize the values.

It might be an excellent thing for us in our co-operative associations in industry to consider the advisability of organizing our associations, eliminating those which are unnecessary and defining those which are of value so that the objects and purposes are clearly understood.

Good Roads Essay Contest

VARIOUS Government agencies and national organizations are announcing to-day the new Good Roads and Highway Transport national essay contest, to be open to all pupils of high school grade. The national prize is a four-year scholarship in the university or college chosen by the successful contestant. It is offered by H. S. Firestone.

The contest will be conducted by the Highway and Highway Transport Education Committee, Dr. P. P. Claxton, United States Commissioner of Education, chairman, who announced to-day rules governing the contest.

Essays must be not more than 500 words and must be written on the subject, "Good Roads and Highway Transport." All essays must be in the hands of local committees not later than June 15.

Local and state prizes are to be announced soon but, according to the committee, essays winning first honors in local and state contests will be eligible to compete for the four years' university scholarship whether local and state prizes are offered or not.

Among Government agencies and national organizations co-operating to make the contest successful are the Bureau of Public Roads, of the Department of Agriculture; the Bureau of Education of the Department of the Interior, and the National Automobile Chamber of Commerce; the Firestone Ship by Truck Bureau; the National Grange; women's clubs, chambers of commerce, and automotive associations everywhere.

The contest is a renewal of the Ship by Truck-Good Roads essay contest held among high school students last year, in which more than 200,000 essays were submitted.

Miss Katharine F. Butterfield, pretty 16-year-old high school pupil of Weiser, Idaho, was the victor in this contest and is enjoying the scholarship at a famous Eastern school. As a result of her conquest, Miss Butterfield will receive a four years' college education.

Back of the idea of the essay contest is the wish of the Highway Transport Committee and co-operating organizations to bring to the attention of the high school pupils of the country the urgent need for immediate improvement in the national highway system.

Training Office Employees

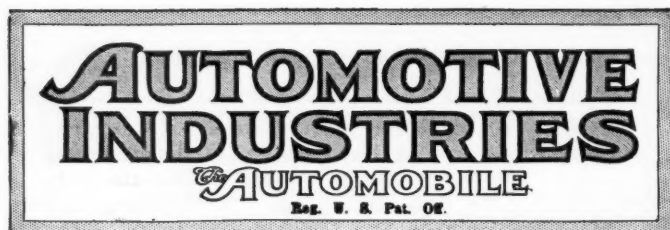
THE idea of training office employees is usually connected with the idea of a large organization employing a great number of persons. New employees in the small office, however, need training if the organization is to function efficiently. This training can easily be carried on without elaborate preparation and equipment.

Three fundamentals are suggested by W. H. Leffingwell, president of the Leffingwell-Ream Co.

1. Teach the worker the purpose of the business.
2. Teach him the purpose of the operation upon which you have started him.
3. Teach him the operation itself.

"These steps," Leffingwell says, "are necessary in all training, and every one of them can be undertaken in even the smallest office, but on the other hand, in very few offices will this training be found."

LANCIA, the Italian manufacturer, has evolved a construction, recently patented in England, by which the width of V-type engines is decreased. In a twelve-cylinder engine, for instance, the axes of the two sets of cylinders do not meet at the center of the crankshaft but a distance below the crankshaft about equal to the length of the connecting rod. The axes of the connecting rods at dead centers make an angle of 20 degrees and the cranks of each pair of cylinders make an angle of 40 degrees. In this way it is hoped to obtain a fairly good balance.



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Present Action Will Influence Future

THERE has been an almost universal increase in the efficiency of labor during recent months. This is due partly, of course, to the scarcity of jobs. It is, however, in some cases due to a more careful study of production problems, with a resulting weeding out of inefficient.

Other firms have taken this time as a definite opportunity to gain the active co-operation of their remaining workers and thus form a firm foundation for the future building up of an efficient working force. There has been very great variation in the attitude taken toward such problems by the various manufacturers. Speaking of efforts in connection with employees to reduce costs, for instance, one employer said he had adopted the method of trying to have the employees feel that they are working with him rather than for him. In reply to an inquiry along similar lines another said: "We are employing efficiency engineers to suggest efficiency methods," while still

another believes the important thing is to "use great care not to reduce wages and salaries as fast as commodities decline. We did not raise them as fast as prices advanced."

The results of the various methods of handling the labor problem during recent months cannot be determined until sometime in the future. Much importance unquestionably attaches to the present approach to and administration of industrial relations matters.

Conscious and Unconscious Education

AN interesting statement appears in a bulletin recently sent out by the Department of Domestic Distribution of the Chamber of Commerce of the United States. The statement refers to the results of a questionnaire answered by two thousand business men through the country. It reads as follows:

"One-fifth reported that they had done away with bonuses. . . . This form of reward was, perhaps, very largely an outgrowth of war conditions, and it may be fair to guess that it is fast disappearing with return to more settled times."

The statement indicates what is probably true, that many of the bonus and similar plans installed during recent years were given not on a sound basis of reward for service or through any fundamental belief on the part of the manufacturer that the worker was entitled to a larger share in the profits of industry, but merely as a bribe. Bribery has often been known to effectively obtain temporary ends, but it is never of any value to the permanent progress of industry or society.

When wages are adjusted on this basis and in this spirit, the workman is almost certain to accept the adjustment in the spirit in which it is given. Judging on the basis of the facts presented, he comes to believe that wages are the result of economic power rather than service rendered, consequently he attempts to obtain wages on the former basis rather than the latter.

In discussing the matter of educating the worker, it must be recognized that certain factors and information go before the worker from the employer which the latter is perhaps unconscious of having given as well as does that "education" which the employer consciously transmits through speeches and house organs.

Speed Not Always Efficiency

THERE was a note in a recent talk made by J. B. Bartholomew before the Tractor and Thresher Group of the National Implement and Vehicle Association that is worthy of consideration by those connected with merchandising efforts for automotive products. Mr. Bartholomew, a veteran in the field of farm equipment operations, was speaking of salesmen. He is quoted as follows:

"We used to call them salesmen, but now they are travelers and some I call Cook's tourists."

His explanation of this was that too many of the

men on the road to-day judge their efficiency by the number of calls they make, or the number of towns they visit. Their sole ambition appears to be to jump from one town to another.

This view is not a new one to many executives. It has probably grown out of the call for more efficiency from salesmen. There was a time when salesmen were entirely too leisurely in their travel, but in making the change it is a frequent complaint that many of them are now moving about the country so fast that they really do not have an opportunity to get acquainted with their dealer customers and to learn what the dealer's troubles may be and why he has troubles.

During the period of order taking, many abuses of the merchandising systems gained a foothold and it is going to be difficult to eradicate some of them. Over speed and too little attention to the complete understanding of the deal was one of these evils. The best seal on a business deal is a complete understanding of it before signing on the dotted line, whether the customer be a consumer or a dealer. Especially is this true in Mr. Bartholomew's field. His consumers are farmers. They buy leisurely and the deals that lead up to the final purchase must be tempered with this knowledge. Some salesmen get so busy they do not have time for an understanding of business.

The Best S. A. E. Meeting

THE success of any convention depends largely upon the support and co-operation of the members of the organization who attend, and engineering meetings are no exception to this rule. At the coming summer meeting of the Society of Automotive Engineers there will be ample opportunity for recreation, but the prime object of the meeting is to afford opportunity for interchange of engineering information, and this fact should not be lost sight of by those who are planning to attend.

Members of the Society will shortly receive advance copies of most of the papers to be presented, and should come prepared to discuss these papers fully, for the life of a meeting depends largely upon the discussion, and the value of the paper often depends upon the discussion it creates. The Society and the author have discharged the bulk of their responsibility when the paper is placed in the hands of the membership. Then the responsibility of the member for making the meeting a success begins. In order that the interchange of information be carried into effect the membership must respond with pertinent comment or criticism. If the views or data set forth in the paper are incorrect or biased, let the fact be known. If they are incomplete or inconclusive, and you can supply from your own experience or records particulars which should be added, go to the meeting prepared to contribute for the general good. If you agree with the author, say so, for this adds weight to information given and assists those with less experience to arrive at safe conclusions. Finally, if you hesitate to speak at the meeting, or if you cannot attend, contribute written discussion.

Authors of papers and members of the staff of the

Society spend many hours in preparing papers and arranging to place them in the hands of members prior to the meeting. After that it's largely "up to" the membership, if they purpose to make the forthcoming meeting the best in the history of the Society.

Facts and Fences

THROUGH basing every action in connection with employee relationships on utter truthfulness, as to facts, and fair reasoning, as to principles, the manufacturer can go far toward building up confidence among his workers and obtaining the good results which accrue from such confidence.

It does not assist in the ultimate solution of the labor problem to say in "boom" periods that labor costs are a very large part of manufacturing costs and that, therefore, the price of the product must vary directly in accordance with labor costs; and then to state in depression periods that labor cost is a very small part of total costs and that consequently a reduction in wages has a very slight effect upon the cost of the product.

Facts are not altered by the side of the fence upon which the speaker happens to be. The question is sometimes even given a different shade to the consumer and to the workman at the same time. Wages are reduced, and the consumer is told that wages are a small part of production costs and do not materially affect the price. The workman is told that wages must be cut so that the price can be reduced to meet competition.

Costs in one typical automobile plant are divided roughly something like this:

Materials 54 per cent.

Labor, 14 per cent.

Sales, 7 per cent.

Other expenses, 25 per cent.

This would indicate that wage reductions would not constitute anything like a dominating factor in the reduction of costs.

In any case the essential thing is to base actions upon considerations of fundamental justice and moral obligation as opposed to expediency.

Credit Standards

A NUMBER of manufacturers have been scrutinizing credits with more than usual care during recent months. Many are lowering overhead expenses partly by reducing the volume of their credit business. When asked about the methods he is using in accomplishing this reduction, one big business man said recently:

"We are more lenient on credits based on moral standards than those based on financial standards."

Here is a practical recognition of the fundamental necessity for a moral obligation between manufacturers. So strong is the interdependence of the various units of modern industry, that the whole structure rests primarily on the ability of these units to co-operate successfully. Such co-operation can be brought about only through a widespread recognition of the moral obligation in industry.

Mellon Proposes New Motor Taxes

Suggests Imposition of Federal License

Treasury Head Would Retain Excise Fees and Add Further Burden

WASHINGTON, May 1—Retention of excise taxes and establishment of Federal license taxes on automobiles was suggested by Secretary of the Treasury Mellon in recommendations for internal revenue revision which were submitted to the House Ways and Means Committee to-day. The application of these taxes was not explained in detail in the letter of submittal, but the Secretary announced that he would appear before the committee to supply further information regarding the Treasury tax program.

It will be noted that Secretary Mellon's proposals differ widely from those of his predecessor. Secretary Houston had suggested additional tax levies on the automotive industry calculated to yield \$290,000,000 over and above the present rate of return. The Houston plan intended to double excise tax, levy a horse-power tax and two cents per gallon on gasoline. No mention was made of these propositions in the Mellon letter to Chairman Fordney, but it is expected that Treasury experts will discuss the suggestions in testifying before the committee next week. Dr. Adams, chairman of the tax advisory board of the Treasury under Houston, framed the former Secretary's recommendations, but did not include them in the latest report.

General Sales Tax Opposed

Mellon advised Congress that the only way to stop these additional internal taxes on automobiles and stamp assessments to an aggregate of between \$250,000,000 and \$350,000,000, would be to cut Federal expenditures. The Treasury believes the miscellaneous specific sales taxes and excise taxes, including transportation, amusement, tobacco and capital-stock taxes, should be retained, but fountain drink assessments and other minor tax should be abolished. The Secretary made clear that he could not recommend at this time any general sales tax, particularly if it were designed to supersede the highly productive special sales taxes now in effect on many relatively non-essential articles.

In proposing repeal of the excess profits tax, Mellon urged that loss of revenue should be overcome by modified taxes on corporate profits of a flat additional income tax on corporations with repeal of existing \$2,000 exemption applicable to corporations. He said flat tax on corporate income at the rate of

TREASURY HEAD ASKS TAX ON HORSEPOWER

WASHINGTON, May 2—Secretary Mellon's proposal to place a Federal license on automobiles is a much discussed topic. Mellon said he understood about 9,000,000 automobiles would be subject to the tax, the number depending upon whether motor trucks were taxed. He believed that they should be subject to the Federal tax which he proposed.

The plan now being considered involved a tax of about 50 cents per horse power on the lower priced and lower powered cars, and a tax which might reach a maximum of \$50 on high powered, expensive cars. Such an arrangement would call for a sliding scale of rates.

5 per cent and exemptions removed would yield \$400,000,000. Furthermore, the Treasury recommended readjustment of the income tax rates to a maximum combined normal tax and surtax of 40 per cent for taxable year of 1921 and 33 per cent thereafter. Secretary Mellon declared in favor of carrying forward net losses of one year as a deduction from the income of succeeding years.

The question of tariff levies was discussed briefly by the Secretary in connection with proposals for imposing sufficient new or additional taxes of wide application, "such as a license tax on the use of automobiles." He stated that if economies in Government operation were impossible, "it might be feasible to provide perhaps as much as \$100,000,000 or \$150,000,000 of the necessary revenue from new duties on staple articles of import, and the balance by taking more effective steps to realize on back taxes, surplus war supplies and other salvageable assets of the Government."

Would Stop Tax Exemptions

The Secretary deems it advisable for Congress to take action by statute or by constitutional amendment to prevent further issues of tax-exempt securities.

With the National Automobile Chamber of Commerce demanding that the floating debt be retired without delay, it is significant to note that the Secretary of the Treasury advised Congress that "if the country can not look to any plan for funding the floating debt to reduce the burden of internal taxes during the next two years. Substantial cuts in current expenditures offer the

(Continued on page 985)

Aluminum Exemption Now Up to Congress

Final Appeal for Tariff Reduction Is Made by N. A. C. C. Representative

WASHINGTON, April 30—Automobile manufacturers made their final appeal to the tariff framers to-day for a reduction of the present rate of 2 cents on aluminum and crude aluminum. It was pointed out that manufacturers would find it difficult to fall in line with general price reductions, if higher tariffs were enacted, because of the increased cost of aluminum. Statistics were submitted by George F. Bauer, of the foreign trade committee of the National Automobile Chamber of Commerce, showing that the cost of aluminum in this country has increased in about the same proportion as the duty has advanced.

He declared that in 1914 when the tariff was fixed at 2 cents, aluminum sold at an average price of 19 cents per pound, and with a duty of 7 cents, under the tariff act of 1913 the average cost of aluminum was 23 cents per pound, representing a difference in the increased price of 4 cents, or nearly the amount of difference between the duty prevailing in 1914 and 1913 respectively.

Bauer stressed the fact that increases were reflected in the prices of automobiles. He submitted several illustrations showing the increased use of aluminum in the medium priced and high priced cars because of the lightness of the metal. The committee was informed that automobile manufacturers would be forced to turn to substitutes for aluminum and thereby put them at a disadvantage with foreign competitors.

Bauer accompanied Milton Tibbitts of the Packard company, and A. B. Whitbeck of the Chandler company in presenting their views to numerous Congressmen who have asked for information on the subject.

DESIGN AIRSHIP SLIDE-RULE

WASHINGTON, April 30—The design of a slide-rule for use in airship navigation has been completed by the Bureau of Standards and a report made to the three military and naval bureaus interested in this problem. Each report was accompanied by a model slide-rule. The report contained, in addition to the general description of the rule and its use, detailed instructions for laying off of all the scales and some thirty illustrated problems showing how to use the instrument. It is understood that a considerable number of these rules are being ordered by the air service.

Receiver Is Named for Austin Company

Insufficient Capital for Operation of Big War Plant Held Responsible

(By cable to AUTOMOTIVE INDUSTRIES)

LONDON, May 2—The appointment of a receiver for the Austin Motor Co. was not unexpected because it has been in financial difficulties for some time. The company has been handicapped since the war with too large a factory for the capital available, and it was unable to reach the heavy production needed to carry the burden. Its prospects were good and steadily improving as the output of tractors and cars increased. The Colonial trade also promised well.

Before the war the stock issued consisted of 400,000 ordinary shares and 250,000 7 per cent preference shares of \$5 par value. This was increased by an issue of 1,000,000 6 per cent preference shares in 1919 and 1,500,000 10 per cent preferred shares in 1920. Ordinary stockholders last year received an allotment of 200,000 shares as a dividend. It had been said recently that the financial status of the company was assured by the backing of a private financier. Prospects improved on that statement, although creditors were none too hopeful of the situation. Quotations for ordinary stock have dropped to less than \$1 and on preference stock to 50 cents.

An official legal statement reporting the negotiations for financing the company admits the difficulty in view of the continued stringency of the money market, but states that negotiations are proceeding, although it was considered necessary to conserve the interests of the business by appointing a receiver and manager.

Has Many Orders on Hand

Orders on hand are sufficient to keep the works going for some time. A special meeting of stockholders will be called to reconsider readjustment and finances.

The chief problem is to avert action by creditors, any one of whom may sue for compulsory liquidation which leaves the onus of resistance on other creditors.

The rapid fall in British car prices increases the difficulty of raising money for Austin. The outlook depends rather on personal confidence in Herbert Austin than on the economics of the situation for the coal strike is having an adverse effect on the demand for automobiles.

Austin recently announced that it

had organized for the production of a light 10-hp. car on the lines of its 20-hp. model, which the new model would supplement. The new line was promised at a popular price.

Humbers have also introduced an improved and enlarged edition of their 10-hp. chassis, which has attained great popularity since it was originally put forward in 1913. The new model has an engine of 3 mm. larger bore (68 x 120 mm., 23 b.hp. at 2000 r.p.m.), and with both two and four-seated bodies is a production falling but little short of the highest grade in chassis, bodywork and equipment. It is, in fact, put forward very largely to meet a pronounced current demand for high-grade small cars.

First Mexican Show Stirs Wide Interest

(Special to AUTOMOTIVE INDUSTRIES)

MEXICO CITY, May 2—The first automobile show ever held in Mexico City opened at noon Saturday with a large attendance and every indication of being remarkably successful. There is keen enthusiasm among the exhibitors and dealers are optimistic over sales prospects. Even those dealers who contended it would be impossible to stage a successful show admit they are greatly surprised at the interest displayed.

Factory representatives from the United States also are delighted with the success of the exhibition, and declare the show would be a credit to New York or Chicago. There are numerous attractive displays together with a considerable number of special chassis cars.

Sales closed the first day totaled 32 passenger cars and six trucks.

The feature of the opening day of the show was a brilliant dinner in honor of President Obregon which was attended by all high Government officials, diplomatic representatives of the United States, England and France, presidents of all the chambers of commerce in Mexico City and prominent business men and financiers.

Exhibits 65 in Number

Sixty-five vehicles are displayed at the show, which is held in the New National Theater. This includes 48 passenger cars, 11 trucks and six tractors. The exhibition includes three Haynes, three Moons, three Overlands and two each of the following cars: Auburn, Cadillac, Chandler, Cleveland, Dort, Franklin, Kissel, Lexington, Lone Star, Mercer, National, Pierce-Arrow, Ranger, and Studebaker.

Single car displays are made by Aperson, Chalmers, Bour Davis, Essex, Hudson, Maxwell, McFarlan, Gardner, Mercedes, Premier and Willys-Knight.

There are two Federal trucks, two Rangers, two Service, one G. M. C., one Gary, one L. M. C., one United States and one Wichita.

The tractors shown are Ranger, Titan, Oilpull, Case, Hart-Parr and LaCrosse.

Fiat Workers Agree to Company's Terms

Factory Down Since April 1 to Resume Production—Berliet to Liquidate

(By cable to AUTOMOTIVE INDUSTRIES)

PARIS, May 2—Eight thousand of the 12,000 employees in the Fiat factory have signed an agreement to return to work under the owners' conditions, and it is probable that the factory, which has been closed since April 1, will resume operations in the near future. The lockout was declared by the management over the question of who should have authority to dismiss workers. The men asserted this authority should be vested in shop committees. The workers also protested against production of war material to be used against Soviet Russia. The Fiat company contended that this war material was for South America.

The Berliet company has made application to the courts for voluntary liquidation. Attempts to escape from its financial difficulties by abandonment of Marius Berliet's founder shares failed. The government opposed this plan because Berliet has not yet paid its war profits taxes.

The retail price of gasoline in France is expected to drop 20 cents a gallon this week when the Government will abolish the import monopoly and liquidate large war stocks at the present market prices, getting compensation for this loss by a tax on importation. A further drop is expected when the new law goes into effect.

The Packard Motor Car Co. is abandoning its French sales service organization.

To Reorganize Parts Service

NEW YORK, May 3—Officials of the Packard Motors Export Corp. here stated to-day that they had learned only yesterday of the discontinuance of the Packard service station at Paris. This station, which was quite extensive, has been under the supervision of the factory at Detroit and did not come within the jurisdiction of the export company. It was closed, according to information here, pending a possible reorganization by which it would come under the export division, whose general offices are centered here. The French market, it was said, would not be left unprotected long but it was too early yet to announce a definite policy.

Goodrich Sets Pace in Tire Price Cuts

Reduction of 20 Per Cent Restores 1913 Price Level—
All Lines Included

AKRON, April 30—With the B. F. Goodrich Co. announcing a 20 per cent flat decrease in prices of cord and fabric pneumatic automobile tires, effective Monday, May 2, substantially all of Akron's tire companies are expected to make similar announcements within the next few days.

Admittedly the Goodrich action was entirely unexpected by other rubber companies at this time, and came as a surprise to most motorists and tire dealers. Inquiry at the Miller, Goodyear and Firestone factories reveals the fact that the Goodrich cut had not been anticipated and that these companies had not so far considered any similar action. With the Goodrich announcement, however, production and sales departments of all these companies were called into conference to discuss the advisability of following suit.

At each one of the three concerns it was stated that no prediction would be ventured as to what action may be taken, although from a standpoint of competition, if none other, it is regarded as apparent in Akron that all other tire companies will be compelled to drop prices to a level of the new Goodrich price sales.

The Goodrich price slash is admitted by officials to be a frank bid for additional business. Whether or not the cut is justified by decreased manufacturing costs is a matter of considerable debate. The cut is not regarded as justified, in view of the raw materials situation, although the price of raw materials has dropped substantially 100 per cent from peak. Small tire concerns may benefit by this, but such concerns as Goodrich, Goodyear and Firestone are known to have on hand large supplies of raw materials, purchased at peak prices last year, while Goodyear, and possibly the others, are obligated to pay the peak prices for supplies contracted for at that time, and yet to be delivered.

Price Back to Pre-War Basis

The Goodrich price reduction carries tire prices back to their pre-war level, and virtually restores prices existing in 1913. Tire prices dropped in 1913, but in 1914, due to the war, were slightly increased. From that time until last year they increased on an average of 37 per cent. Prices were cut within the last six months by practically all companies, the cut averaging about 15 per cent. Thus with the latest 20 per cent reduction, the prices of Goodrich tires, at least, go back to the 1913 level.

This is considered significant for the motorist, as the 1914 tire gave an average service of 4000 miles, while the tire of to-day has greater durability and

gives a fair average of 8000 miles. A tire costing \$50 in 1914, and giving 4000 miles service, made the tire cost per mile of motor travel one and one-quarter cents. The 1920 price of the same tire was about \$70, but the tire gave at least twice the mileage, reducing the tire cost per mile to seven-eighths of one cent, despite the fact the tire cost \$30 more. But with the present 20 per cent drop, in addition to the cut made a few months ago, the 1921 tire, giving an average of 8000 miles service, costs no more than the 1914 tire, which gave only half the mileage. This then reduces the cost per mile, per tire, to five-eighths of a cent.

The comparison of mileage costs is
(Continued on page 984)

Jordan Prices Down \$400 on All Models

CLEVELAND, May 2—Effective today, prices on Jordan cars are reduced \$400. The new schedule of prices follows:

	New Price	Former Price
5 passenger touring.....	\$2250	\$2650
Roadster	2250	2650
7 passenger touring.....	2475	2875
4 passenger closed brougham.	3300	3700
5 passenger sedan.....	3300	3700

Speaking of the reductions, President E. S. Jordan said:

"The automobile business is coming back. We are very fortunate in that we have liquidated all our inventory and we are buying and producing on a quantity basis.

"Our production has now reached 100 per cent and the new price will justify itself by doubling our production, thereby greatly reducing our overhead. We find that the purveyors of materials are willing to grant price concessions when a firm order for material is offered to them. The Jordan company always had been in a strong financial condition. In spite of slow production during the winter all obligations were met in a satisfactory manner."

W. D. Riley, sales manager, said salesmen and distributors would be instructed to emphasize that Jordan has made a bonafide revision of prices downward. "Since September, 1920," he said, "it cannot be shown that this company raised prices after announcing cuts."

VICTOR DEFERS PRICE ACTION

SPRINGFIELD, OHIO, May 2—Directors of the Victor Rubber Co. made an inspection of the plant here and were advised by President H. S. Berlin that prospects are encouraging for a busy season. The daily production is 500 tires, which is the normal output of the works. General conditions are excellent, according to Treasurer H. H. Durr. There is a good demand for cord tires, it was stated. All of the present policies of the company were confirmed by the directors at their conference Friday at Hotel Shawnee following the plant inspection. So far no reduction in the price of tires has been announced. Berlin said that some announcement would probably be made soon.

Marmon Cuts Price to New Cost Basis

Reductions Range from \$1,015 to \$1,400—Look for Business Stimulation

NEW YORK, May 2—Reducing the price of the Marmon 34, seven-passenger, four-passenger, and club roadster cars from \$5,000 to \$3,985, effective today, is the most important action in the price field that has taken place since the reductions last fall. The Marmon reduction of over \$1,000 makes the new price of \$3,985 one based on the lower production cost of the next eighteen months, and is a complete reduction rather than a series of minor ones, and as such should have a stabilizing influence. Reductions on the other body models are:

Model	Former Price	New Price
4 and 7 passenger.....	\$5000	\$3985
Speedster	5300	4185
Coupe	6150	4875
Sedan	6600	5275
Limousine	6800	5400
Town car	6800	5400

Commenting on the reduction, Vice-President Moskovics said:

"We believe that the spirit of our reduction is in keeping with the demands of the American public and in accord with the spirit of the times. We do not believe that any company can sit tight on its inventories purchased during the period of high prices and assist in starting the prosperity in this country.

"A stand-pat price policy is not in accord with the recent announcement of a 14 per cent reduction in steel.

"Material can now be purchased for less than was the case a year ago. Present inventories are worth only their reproduction value. So we have disregarded prices paid for present inventories and figured instead what materials and labor can be purchased for now or in the immediate future. We believe the public is entitled to purchase its needs at present day valuations and my company is willing to sell its motor cars regardless of the necessary sacrifices.

Increased Buying Expected

"Not only this, but Marmon believes that this radical price reduction will broaden its market four fold and enable it to utilize the tremendously increased manufacturing facilities of its Indianapolis plant."

Marmon has made no changes in discounts to distributors, sub-dealers or direct dealers under the new prices. One reason back of the heavy reduction is that of not making any provision for long trades and thereby encouraging the over-appraising evil at a time when the used car market is heavily overstocked throughout the country. From many parts of the country have come reports of too high appraisal on cars which has brought severe criticism from many distributors handling various lines, and a decisive price reduction should stabilize rather than disturb used car values.

Receiver Is Named for Hartford Parts

Friendly Action Is Undertaken to Permit Company to Continue Operations

HARTFORD, CONN., April 30—Judge Edwin S. Thomas in the United States District Court has granted the application for the appointment of a friendly receivership for the Hartford Automotive Parts Co. so that the assets of the company may be preserved from unfriendly creditors and the company be permitted to secure its finances. R. E. Carpenter, president of the company, and Cyrus C. Chamberlin of Southington, are named as temporary co-receivers. It is anticipated that application will be made shortly to have the receivers permanent.

The company has a factory in Hartford and another in Kalamazoo, and has a large amount of stock on hand and many orders. In the opinion of Peter A. Frasse & Co., who maintain a distributing office in Hartford, the Hartford Automotive Parts Co. could reestablish itself financially if permitted to complete its orders. The Frasse company through its attorney made the application for the receivership.

The receivers have been ordered to file their bonds of \$100,000 and they are permitted to conduct the business as long as it can be conducted at a profit. R. E. Carpenter was recently made president of the company, which has been one of the leading manufacturing enterprises of the city. The company some time ago removed to the former Billings & Spencer plant.

URGES AIRCRAFT FOR NAVY

WASHINGTON, April 30—Establishment of a bureau of aeronautics in the Navy Department has been recommended to the Senate in the report of the Senate Naval Affairs Committee. The Keyes bill which the committee favored provides for a central authority with the bureau independent of the other aviation groups of the Government. Passage of the bill is expected at the special session, for nation-wide interest has been aroused by demonstrations of the efficiency of aircraft as naval auxiliaries for offense and defense.

MARATHON TAKES OVER BURLOCK

WAUSAU, WIS., April 30—The Marathon Rubber Products Co. of Wausau, Wis., a new \$300,000 corporation, which takes over the plant and business of the defunct Burlock Rubber Co. of Wausau, has resumed the operation of the plant. The officers of the new company are: President, J. H. Elliott; vice-president, F. G. Schneider; secretary, Roy E. Chellis; treasurer, Harold E. Damon. E. B. Helwitz, an expert in rubber manufacture, has been appointed general works manager.

The company begins operations under favorable financial conditions, being free from debt and having from \$75,000 to \$100,000 worth of raw material on hand, paid for, besides some finished goods. Practically all of the 200 stockholders held shares in the defunct company and pooled their issues to purchase the property for \$65,000 in cash at receiver's sale. The old Burlock company was a \$250,000 corporation and its liabilities at the time of bankruptcy a month ago were \$164,507.65.

Small Stockholders to Advance \$200,000

INDIANAPOLIS, April 29—Steps are to be taken immediately to rehabilitate financially the William Small Co. of this city, automobile manufacturers. At a recent meeting here of the stockholders it was decided to refinance the company immediately. The stockholders, after looking over the plant and seeing what has been done, agreed to subscribe the additional money on one, two, three and four-year notes, non-interest bearing to the extent of \$200,000. According to William P. Small, founder of the company, this amount will enable the company to discharge the receiver through payment in full of the creditors and will put the plant back on its feet.

The stockholders, through the directors, declared, following the meeting, that the company was solvent and all it needed was some emergency money. Production has never been stopped and will be increased as the sales department is developed. The new directors elected at the meeting are William P. Small, Walter G. Todd, John Rau, Elmer E. Stout, J. F. C. Martin, E. L. Jacoby, T. A. Lavelle, D. L. Fryer, Carl Rost, W. A. Moore and D. H. Lockwood. Small, Todd and Martin were re-elected. The number of directors was increased from five to eleven.

Miniger to Continue As Auto-Lite President

TOLEDO, April 30—The election of C. O. Miniger as president of the United States Light & Heat Corp. has given rise to the belief that he had resigned as president of the Electric Auto-Lite Corp. On the contrary, Miniger retains his position at the head of the Auto-Lite, and D. H. Kelly, who has accepted the vice-presidency of the United States Light & Heat Corp., will take active charge of that plant at Niagara Falls. Kelly formerly was with Miniger at the Toledo plant.

TO BUILD NEW SNOW PLOW

MILWAUKEE, April 30—The Milwaukee Snow Conveying Co. has been incorporated with a capital stock of \$25,000 to develop an invention of A. F. Krueger. This consists of a high speed rotary snow plow mounted on motor truck chassis. It plows a swath 10½ ft. wide, throwing the snow from 20 to 35 ft. to one side.

Ruggles Organizes New Truck Company

Will Start Manufacture with Two Models in Saginaw—Has \$2,000,000 Capital

SAGINAW, MICH., April 28—Following the completion of the organization and the election of officers, announcement was made here to-day of the formation of the new Ruggles Motor Truck Co., with a capitalization of \$2,000,000, to manufacture a light truck and two-ton truck, which will be followed ultimately by a complete line. Frank W. Ruggles, former president and general manager of the Republic Motor Truck Co., is president of the new company.

Ruggles is recognized as a leader in the motor truck industry. Under his guidance the Republic company of Alma, Mich., grew to be the largest motor truck manufacturer in the world. The new company has ample financial backing, and, with Ruggles' truck manufacturing knowledge and experience, the new Saginaw enterprise looms as a new giant in the truck field. Production on the models will start immediately and the first truck models it is expected will be ready for showing in July.

The officers and directors elected are as follows: Frank W. Ruggles, president; W. J. Wickes, vice-president; Ezra L. Smith, secretary; Walter C. Hill, treasurer; Charles T. Kerry, assistant treasurer; John F. O'Keefe, counsel. The directors are Ruggles, Wickes, Smith, Hill, Kerry, O'Keefe, Benton Hanchett, Julius B. Kirby, H. T. Robinson, Otto L. Dittmar, John J. Thorne and Harry H. Price.

Connersville Factories Find Business Growing

CONNERSVILLE, IND., April 29—There is no longer question that business is coming back in this automotive center. The Rex Mfg. Co., the pioneer winter-top manufacturers, was nearly out of business sixty days ago, but the orders are weekly increasing. The engineering department has been exceedingly busy the past thirty days. Then will come the production rush. This company has now taken up in earnest the California top and the demand for it equals the old standard top.

The blower companies that produce more than 50 per cent of the world's rotary blowers, gas exhausters, etc., are holding to about a 33½ per cent basis. President John T. Wilkin of the Connersville company will visit Europe in June in the interest of his company.

The Wainwright Engineering Corp., makers of pistons, rings and cylinders, some two years ago saw the future in replacement pistons in rebored cylinders and now have the entire United States covered through the jobbing trade. It is the busiest shop here.

Farmer Buyers Back in Columbus Market

Good Crop 'Prospects Bring Return of Rural Business—
Unemployment Lessens

COLUMBUS, April 30—With the arrival of better weather, followed by a period of heavy rains and changeable conditions, demand for automobiles in Columbus and central Ohio territory is showing quite an increase. All of the dealers located in Columbus report a gradual expansion in their business with much brighter prospects for the future. Business is more settled than formerly and it is the consensus of opinion that the worst of the slump is over and that there will be a gradual increase in business during the coming two months.

All lines of cars are selling better than was the case during the month of March and early in April. This applies equally to the higher priced cars as well as to the medium priced and lower priced machines. One of the best features of the trade is the fact that rural dealers are now experiencing better business as there is more buying among the farming population. With prospects for good crops this year, the farmers are now coming into the market. All rural dealers are more optimistic, and the remainder of the year is expected to show good results.

City dealers are also having a better run of business as industrial conditions are righting themselves slowly. There is not quite as large an unemployment problem as formerly and this is having a good effect on every line of business, the selling of automobiles included. It is found that not as much work is required now in the sale of an automobile as formerly, people are inclined to go ahead and are not playing a waiting game as was the case several weeks ago.

The enclosed car is still one of the most popular types of passenger vehicles. All of the local dealers report a big increase in the sale of enclosed cars, while touring cars are not showing as well as the enclosed models. Runabouts still continue rather popular, as is shown by an analysis of the demand.

With business slowly improving in every line and also because of the fact that Columbus was not as badly hit as some other cities by the depression, the automobile industry is now getting on its feet with a vengeance. Dealers who have been somewhat pessimistic during the early parts of the year are coming out and their sales forces are hustling for business. These things have caused a better feeling in automobile circles generally.

SNOW HITS DES MOINES TRADE

DES MOINES, April 29—The first half of April has been a disappointment to the motor car dealers of central Iowa and has not produced the business that had been expected after the March

spurt. Des Moines distributors almost without exception declare that April business for the first fifteen days was considerably behind the pace set by March. The falling off is largely attributed to weather conditions as a greater part of the month so far has been rainy and cold. Last week it started to rain early in the week and kept it up until Friday night when the rain turned to snow, and Saturday Des Moines had the heaviest snowfall of the winter. Nine inches of snow fell Friday night and Saturday.

G.M.C. Makes Changes in Unit Management

NEW YORK, May 3—General Motors Corp. announces that John L. Pratt has been appointed general manager of the accessory division of the corporation, with headquarters in New York City. He relieves Alfred P. Sloan, Jr., vice-president of the corporation, of direct supervision over the activities of the accessory units as follows:

Hyatt Roller Bearing	New Departure Mfg.
Remy Electric	United Motors Serv-
Jaxon Steel Products	ice
Dayton Eng'g Lab-	Delco Light
oratories	Klaxon
Harrison Radiator	Champion Ignition
Lancaster Steel	Frigidaire
Products	Dayton Wright

Pratt was formerly special assistant to the president of the corporation and chairman of both the inventories committee and the appropriations committee. Prior to coming with General Motors he was director of the Motors Development Division of the DuPont Co. His position now is similar to that held by Sloan under the Durant regime.

E. F. Johnson has been appointed general manager of the inter-company parts division of the corporation, with headquarters at Detroit. Johnson assumes direct supervision over the activities of the inter-company units as follows:

Saginaw Parts	Canadian Products
Saginaw Malleable	Northway Motor
Iron	Central Forge
Central Foundry	Central Axle
Michigan Crankshaft	Lansing Axle
Central Gear	Muncie Parts
Saginaw Products	Muncie Products

KOKOMO NEARS 1000 A DAY

INDIANAPOLIS, April 29—Announcement was made yesterday by Randolph Mitchell, assistant secretary of the Kokomo Rubber Co., that the record production for one day since the recent resumption of operation was 998 tires, while each day during the past week averaged 950 tires, and they expect soon to produce 1000 tires a day.

REVERE TO BE REORGANIZED

FORT WAYNE, IND., May 2—A new organization to take over the plant of the Revere Motor Car Corp. of Logansport, Ind., is now apparently certain. The plan is for the organization of a company with a capital stock of \$500,000 among the old stockholders. This plan is meeting with approval.

Perrin to Direct Stevens-Duryea Work

Noted Designer and Engineer Is
Chosen Manufacturing Executive of Company

CHICOPEE FALLS, MASS., May 2—John G. Perrin, one of the foremost engineers and manufacturers in the automotive industry, has been elected a director and vice-president of Stevens-Duryea, Inc., in charge of engineering and manufacturing. He has been serving for several months in a consulting capacity and now has consented to become permanently identified with the company.

The business career of Perrin was started as a draftsman in the Lozier bicycle factory in Toledo. He soon evinced a desire to learn the practical side of shop practice and apprenticed himself as a toolmaker. He filled various positions with the Lozier company and at one time was in charge of the plant at Thompsonville, Conn., where its screw machine work was done.

In the early days the Lozier company built bicycles and marine engines, but Perrin's inclination was toward motor cars. He aspired to design a fine car and in preparation for this work made an intimate study of all foreign cars. He went so far as to spend six months in the repair shops of the larger New York companies selling foreign automobiles.

He then designed the first Lozier car, but as the company was not ready to take up its manufacture he went for a short time to the Waverly Electric Car Co. at Indianapolis and designed for it a new model electric. The Lozier company soon recalled him, however, as its chief engineer. He later was made vice-president in charge of engineering and production.

When the Lozier company went out of business, Perrin became chief engineer for the Timken Detroit Axle Co. During the war he served in various capacities and finally was called upon to help the Willys-Overland, Ltd., of Toronto to fill a contract for Sunbeam airplane motors. Under his direction the company reached a production of five complete 8-cylinder Sunbeam engines a day before the war ended.

Perrin left Overland last fall to devote his time to personal interests. He had made definite plans for the future, but became interested in Stevens-Duryea and now has cast his lot definitely with that company.

DELIVERIES HANDICAP TRADE

TORONTO, April 29—Much more grouching is heard in the trade regarding deliveries than sales. Indeed, a recent canvass showed that almost without exception distributors and dealers have been agreeably surprised with the "comeback" of business, several leading companies reporting better business than last year—"every month so far ahead of corresponding month of 1920."

Cotton Financing Cuts Car Credits

New Orleans Dealers Feel New Stringency as Crop Selling Plans Materialize

NEW ORLEANS, May 1—Somewhat improved conditions in the sugar market; the working out of cooperative plans for selling the \$18,000,000 to \$20,000,000 worth of cotton now held in warehouses in this part of the South; heavy planting of crops other than cotton and sugar, and the general feeling that Louisiana, Mississippi, Texas and Alabama have suffered less from the recent business depression than most other sections of the country, helped to keep the retail automotive business in New Orleans for April up to the good figure set in March.

Sales of standard cars were about 80 per cent of those of eighteen months ago; sales of the higher priced cars about 65 to 70 per cent, while, like Abou Ben Adhem, the Fords "led all the rest," with sales of between 95 and 97 per cent normal. There is no denying that Ford dealers, combined with Ford price-cuts, have "put one over" in the automotive industry in this part of the South. Scores, probably hundreds, of men in Louisiana who had intended to buy higher priced cars on time payments are driving Fords—the little sedan especially having been the hit of the season—for which they have paid in full about what they would have had to pay for the first payment on a more expensive car.

Reports from the country, and especially from the city centers of distribution outside New Orleans and Jackson, indicate that the dealers in those cities and in the country have not fared so well as their New Orleans brethren. The reason seems to be that the city dealer learned a rather expensive lesson on the used car during the war period and is cutting his allowances for used cars down to a minimum or not taking them at all, while the country and small-city dealer is still overstocking himself with used cars, and is trying to get rid of some of them, to the exclusion of his new car business.

Used Cars Pile Up

This condition also complicates the used car situation, and the purchase of a car has become a matter of haggling on both sides, concessions on the part of the dealer, and a stiff position held by the prospective purchaser, since this is essentially a buyers' market, as it has been for several months. The banks have been calling on the dealers for close margins on their loans, and—despite the impression the bankers are trying to make, that they are "helping the automotive industry"—renewals are difficult, and the majority of the banks look with anything but favor on automobile paper. This being the case, the dealer who is loaded up on used cars simply HAS TO MOVE HIS STOCK.

Obviously this is a situation which is full of dynamite for the industry, but it has worked out in favor of the city dealer as against his country brother, because the city dealer, having taken in used cars at a minimum price and still held his figures on the new cars he has sold to these used car owners, is in a better position to put out "bargains" in used cars, and even to reduce prices under those of his bargain sales, than is the country dealer. One city dealer estimated to the writer that 65 per cent of the automobile dealers in Louisiana outside New Orleans are to-day overstocked on used cars.

(Continued on page 984)

St. Louis Makes Ready for Big Buying Period

ST. LOUIS, April 29—A general survey of retail trade conditions in this city reveals the fact that the sales and trend of indications of the past two months are leading dealers throughout the entire territory toward the expansion of their sales forces and the perfection of systems for the efficient handling of what they believe will be a great buying period. In preparation for the expected prosperity many local firms are holding special training schools for their new and veteran salesmen; many new service stations and gasoline filling stations are being erected, and many innovations are being introduced by various dealers.

Robert E. Lee, secretary of the St. Louis Automobile Dealers' & Manufacturers' Association, declared that the past seven weeks have given sufficient indication of a marked improvement in the motor car business.

"Many firms in this city," he said, "have done a larger business in April than they did in April of last year. And the sales are not confined to the small and inexpensive cars, many of the larger and more costly machines being greatly in demand. The banks are in a splendid condition. In fact, better than they have been for some time."

IMMEL PLANT TO BE SOLD

COLUMBUS, April 29—Robert H. Schryver, receiver for the Immel Co., makers of automobile bodies, has applied to the courts for authority to sell the plant and all assets. Schryver states in his petition that there are no orders on which work can be started. The plant has been closed for several months and the organization has been disrupted as a consequence. It is believed that the sale will occur about June 1.

DU PONT CUTS VARNISH PRICE

WILMINGTON, DEL., May 2—Substantial reductions on all lines of varnishes have been made by the E. I. du Pont de Nemours & Co., Inc., effective to-day. The reductions range from 25 cents a gallon on the lower grades to \$1 a gallon on the high-class product. The company declares the reductions are warranted by the reduced cost of production and by the increased volume of sales.

April Selling Drop Mystifies Atlanta

Dealers Look to May to Bring Renewed Buying—Truck Sales Low

ATLANTA, April 30—Dealers and distributors in the Atlanta territory are at a loss to understand just what has happened to slow up automobile sales the past three or four weeks. There is no question but that sales have fallen off and even the most optimistic distributor will admit it, but none of them seem to exactly understand its cause. During and immediately following the Atlanta automobile show the early part of March sales were unusually good considering the period of depression the industry had just passed through, but early in April the Atlanta dealers began to note a decline in sales.

This has continued almost the entire month, and while April sales will compare favorably with March, considering the fact that the show was held during the latter month, April sales should have greatly exceeded March, in the opinion of most of the dealers. Warm weather has come in earnest and generally early spring witnesses an increased demand for motor cars. As yet, however, it is not noted in the Atlanta territory. The dealers are still optimistic enough as regards the future, and confidently believe that May will note a steady increase in the volume of sales.

Truck sales are at a very low ebb and have been for several months. While there may be some improvement in truck business the next month or two no great activity in that regard is expected until all lines of business in this section return to something like normal. Conditions are very bad in the lumber industry and the agricultural industry, two big users of motor trucks and tractors in the Southern field. Until conditions materially improve in these and other important industries of the South, there can be no great demand.

Saxon Sells Service on All Former Models

DETROIT, April 30—Through a deal consummated with the Saxon Service Corp. the Saxon Motor Car Co. relinquishes parts service rights on all Saxon cars running up to the time the Saxon Duplex was put on the market, in consideration of \$550,000. The Saxon Motor Car Corp. has \$500,000 outstanding bank loans of which it will pay \$400,000 and also \$85,000 to merchandise creditors.

This deal will permit the Saxon company to start production of its new model with the Gray engine immediately, President C. A. Pfeffer said to-day. Production on the new model is not expected to reach capacity output of 100 daily for some time. It is understood that the Saxon Service Corp. is controlled by Maurice Rothchild of Chicago.

British Competing for Japanese Sales

American Cars Dominating Market—Local Advantages of Both Cars Compared

SEATTLE, April 29—Of the 9000 automobiles now in use in Japan, fully 75 per cent are of American manufacture, in contrast to the situation before the war when British and Continental cars dominated the market. It is reported that British cars are again arriving (in very few numbers, however) in Japan and in other Far Eastern countries.

The average type of car used in Japan is medium-priced, open model, retailing on the market for from 7000 to 8000 yen (yen 50 cents normally).

A Japanese publication just received here from the Orient says that the typical British export model is a four-cylinder job, having a 15 horsepower, and actually developing 30. The L-head system survives. Ignition is by high-tension magneto, and the carburetor is conventional, with gravity feed from the gasoline tank, which is usually located in the dash. Lubrication is by force feed, with pump, and the cooling system is conventional.

The engine, on the whole, is of fairly clean design and very good workmanship, and accessibility is a feature. A cone clutch is used, and the transmission, which is placed amidships, provides four forward speeds and one reverse. Final drive is by propeller shaft to a bevel-gear rear axle. A great many cars of this type use an under-slung worm type of final drive. In either case a torque tube is employed, and the rear springs are cantilevers. The foot brake operates on the propeller shaft and the hand brake actuates expanding shoes in the rear wheel drums. The front springs are semi-elliptic and the steering is conventional.

American Type Most Powerful

The corresponding American type is described as a light six, rated at about 25 horsepower and actually developing about 50. The engine is of high-speed design. It is a block casting, with three bearings and all valves are on the same side. Ignition is furnished from the battery of the starting and lighting system, but many American manufacturers equip all cars for export with a high-tension magneto in addition. The carburetor incorporates some device for pre-heating the fuel, and feed is through a vacuum tank located under the engine hood, the gasoline tank being between the frame members at the rear of the chassis.

The cooling and lubrication systems are similar to those employed on the British model. The clutch is a dry-plate disk, and the transmission, which provides three forward speeds and a reverse, is a unit with the engine. Drive is by open propeller shaft through spiral bevel gears to the rear axle, both drive and torque being taken by the rear springs, which are semi-elliptic, very long, almost flat,

and shackled at one end only. The rear springs are underslung from the rear axle. Both hand and foot brakes operate on rear wheel drums, the former expanding and the latter contracting. The front springs and steering system are similar to the English model.

Mechanically, the two models are described by the Japanese critic as quite different. The American is given credit for being far more powerful, and its flexible engine and low gearing provide a wide range of speeds in high gear. The British car is pictured as the better piece of machinery.

Exchange Rates Hurt South American Sales

BUENOS AIRES, April 1 (*By Mail*)—With the rate of exchange between Argentina and the United States at 131 per cent dealers in this country have been obliged to sell many cars at a loss partly due to the impossibility of competing with European cars that are now entering the market. Several makes of American cars have sold well notwithstanding this handicap. Many dealers of American cars are carrying large unsold stocks in their agencies and in the custom house as well.

The accessory business has suffered severely, due to the very large stocks on hand of practically all kinds of accessories. Some are trying to sell these at any price and there is good hope that the situation will soon improve and approach normal.

The sale of trucks in most of the South American countries is in its infancy but the conviction is general that there will be little extension of railway lines and that the building of highways and installing motor truck service furnishes a more flexible and cheaper scheme of transportation. In all countries of South America this phase of truck development is one of the most attractive. To-day there is in Argentina a total lack of good highways and truck use is largely confined to the cities and some of the larger farmers. Road building sentiment is on the increase. What is needed is some road promotion organization that will spread good roads propaganda.

The sale of passenger car tires has not diminished in cities like Buenos Aires due to the large number of cars used as taxis in the summer months of November, December, January and February. European competition is intense and some of them are offering their goods at very low prices.

PANAMA TO BUILD ROADS

NEW ORLEANS, April 30—The Republic of Panama has commenced work on a nation-wide system of good roads, according to announcement by the consul of that country in New Orleans. The plan is to connect Panama City, the national capital, with the capital of each State of the republic by an automobile road. "Good roads throughout the country will increase production and raise the buying power of the people."

Australia Suffers Wave of Depression

Little Buying Looked for Inside of Year—Automobile Stocks Six Months Ahead

SYDNEY, AUSTRALIA, April 11 (*By Mail*)—The wave of depression which swept across the United States in June, 1920, has reached Australia, which is now in the throes of the worst trade depression the Commonwealth has known. This general trade depression is bringing in its train a large army of the unemployed. It will be twelve months before this country is in condition to buy automobiles and before trade is back to where it was a year ago. Practically every automobile dealer in Australia is loaded too heavily with cars, and a conservative estimate shows that there is a six months' supply on the dealers' hands, which is too heavy for an industrial condition such as exists to-day.

The bottom fell out of the used car market and good used cars can now be purchased at one-third to two-thirds of what they sold for a few months previously.

Although Australia had a good wool clip there is not much market for wool. The wheat crop was a record one, but before the crop was harvested overseas markets had fallen, and to-day the Australian farmer is much like the American farmer, very short of cash, and not a potential buying factor for the next few months.

Another important factor entering into the automobile situation is the difficulty of New York and London selling bank drafts. Australian bank credits held by Australian bankers in London are exhausted. Consequently the only way to do business is a letter of credit of 30, 60 or 90 days' maturity, and the banks are very reluctant to issue such.

INDIA FIELD FOR TANKS

WASHINGTON, April 29—Consul Weddel, in a report to the Bureau of Foreign and Domestic Commerce, expresses the belief that a growing market for portable tanks could be developed in Calcutta, India, and surrounding district, if properly introduced. At present, he says, gasoline in Calcutta is distributed by the oil companies to dealers by means of small handcarts with a capacity varying from 10 to 30 two-gallon tins, drawn by coolies.

SOUTH AFRICA IMPORTS HIGH

WASHINGTON, April 30—According to American Trade Commissioner Stevenson of Johannesburg, South Africa, official figures for the first 11 months of 1920 show imports of passenger cars into South Africa numbering 9150, valued at \$18,378,765 at the normal rate of exchange. Lorries to the number of 239, valued at \$601,205, were imported during the year.

Collins to Build New High Grade Car

Durant Stockholder But Company Will Be Independent— Merger Story Denied

NEW YORK, May 2—The following statement in reference to the future plans of R. H. Collins, whose resignation as president and general manager of the Cadillac Motor Car Co. was accepted last week, was authorized to-day:

"The Collins Motor Car Co., a Michigan corporation with a capital of \$10,000,000, is being organized to manufacture a high grade car bearing the name Collins. The car will be ready for the inspection of the public Jan. 1, next. Collins, with a few of his former associates and personal friends, will control the company. The plant will be located in Detroit."

This statement, prepared in the New York headquarters of W. C. Durant, shows that there has been a sudden change in the original plans under which Collins was to head the Michigan subsidiary of Durant Motors, Inc., which was to be known as the Durant-Collins Co. There will be a Durant-Michigan company, but it will produce the Durant four-cylinder car. The original plan called for the production of a high grade car to be known as the Collins, and this part of the program has not been abandoned, although the car will be made by an independent company. Durant will be a large stockholder in the Collins company.

While Durant will be intimately associated with Collins in the new company, the corporation will not be, strictly speaking, a subsidiary of Durant Motors, although the business relationship between the two is expected to be close. No details of the corporation's plans are available beyond those contained in the statement. This would indicate that there is no basis for the report from Cleveland that the company would locate a plant in that city.

Plant Location Indefinite

It is understood that the Cleveland story, printed under scare heads in the newspapers of that city, was given publicity under a prearranged plan whereby it was to be printed as soon as acceptance of Collins' resignation from the General Motors Corp. was announced. This was done without consideration of possible changes in the plans.

The program, as it was understood in Cleveland, called for the location there of a large factory by the Durant-Collins Motor Corp. According to the Cleveland story, the car which it was proposed to manufacture there would compete with the Buick.

No details in regard to the Durant car have been made public, but it has been announced it would sell for less than \$1000 and several officers prominent in the Chevrolet company have joined

the Durant organization. The latest to go with him was M. J. Lahey, who has retired as sales manager of the Chevrolet Motor Co. of New York to become sales manager of the Durant Motors Co. of New York, which recently acquired the Goodyear plant in Long Island City. Lahey's successor has not been appointed by the Chevrolet company.

There was a sharp advance to-day in Pierce-Arrow and Studebaker stock on the stock exchange on reports that Durant was planning a merger of his company with them. It was emphatically denied at Durant's office that he had any interest whatsoever in Pierce-Arrow. So far as Studebaker is concerned, he recently has become a large stockholder in that company, but so far as can be learned there is no probability of it coming under his control.

Charles F. U. Kelly Now with Quaker Tires

PHILADELPHIA, May 2—At a meeting of the directors at the office of the Quaker City Rubber Co., Philadelphia, Pa., Charles F. U. Kelly was elected director of sales of the tire division of the company, which also manufactures a full line of mechanical rubber goods.

Mr. Kelly has been engaged in directing tire sales practically all his life. He began selling tires to the bicycle industry in 1893 and with the exception of a much needed rest during the past year has been continuously engaged in tire selling. His experience is far reaching, having been associated in the past with such concerns as Goodrich, Pennsylvania, Racine, Continental and Lee.

Sales offices have been opened at 1664 Broadway under the name of the Quaker City Rubber Co., Tire Sales Division, from which address Mr. Kelly will conduct the selling campaign.

Mr. A. H. Thomas, formerly associated with Mr. Kelly, has again returned to his old employer and will assist in the promotion and sale of the Quaker City tire products.

NASH OUTPUT 79 PER CENT

KENOSHA, WIS., May 2—The plant of the Nash Motors Co. is operating at 79 per cent of normal and the new factory in Milwaukee is increasing production daily. Orders for May show a healthy increase over April. Low ebb in Nash production was reached in December with a total of 714 cars. The tide began to turn in January and production in March had jumped to 2081. The production schedule for April called for 2311.

CANADIAN FORD RESUMES

DETROIT, May 2—The Ford Motor Co. of Canada has resumed full time operations with a normal force of 2900 men, according to Wallace R. Campbell, secretary of the company. The plant has been closed on Fridays and Saturdays each week for the last six months.

Eaton to Push Plans to Restore Standard

Resigns as Joint-Receiver of Company to Further Reorganization Work

CLEVELAND, May 2—J. O. Eaton, who has for some months been a joint receiver of the Standard Parts Co. with Frank A. Scott, yesterday presented his resignation to Federal Judge D. C. Westenhaver. It was stated that Eaton resigned to devote himself to bringing about a reorganization of the big \$20,000,000 automobile parts concern that has been in the hands of a receiver since last September. Eaton will cooperate with the creditors' committee, which has presented a plan for placing the corporation on a permanent business basis.

At the same time it was learned that within the next ten days letters endorsing the creditors' plan probably will go to stockholders from their special committee that had been named to consider the proposal. From now on special effort will be made to complete the reorganization. Prompt action is regarded as highly necessary, in view of the satisfactory conditions in the automobile trade and the demand for products made by the corporation.

Cyrus S. Eaton of Otis & Co., originator of the creditors' plan, has issued a statement to stockholders, in which he urges them to support the latest proposal. In his address he first calls attention to the fact that a distinction between creditors and stockholders must be borne in mind. The creditors loaned to the company money which became due last September, and the stockholders contributed money for an indefinite period in the hope of obtaining profits from the business; so that they assumed the risks of the enterprise.

Creditors Suspend Payments

The new financing plan which has been formulated provides for the formation of a new company to take over all the properties of the old corporation and for the issuance of \$6,500,000 of 8 per cent first mortgage notes, maturing Jan. 1, 1924, and of 100,000 shares of no par common stock, all of this to be turned over to the creditors in payment of the company's debt to them. Inasmuch as the company's total outstanding debt is \$10,000,000, this means that the creditors thus suspend collection of 65 per cent of their claims for the period of three years and accept stock in the company for the remainder. The plan also provides that stockholders in the old company are privileged to purchase from the creditors' stock of the new company.

"The plan involves a sacrifice by the creditors," said Eaton. "But an overwhelming number of creditors have been persuaded to accept it. If this plan miscarries no one is prepared to suggest an alternative."

Goodrich Sets Pace in Tire Price Cuts

Increased Mileage Makes Tires
Cheapest in History—Other
Companies Reduce

(Continued from page 978)

even more striking if made with 1910 tire mileages, and tire prices.

In 1910 a 34 x 4 tire cost about \$53.40. The 1920 price for the same tire was \$40.10, while the price up to May 2 has been \$36.10. The Goodrich 20 per cent cut brings this tire down to \$28.88, which means a difference or saving of \$24.52 per tire, as compared to 1910 prices, and yet the tire of to-day gives three times the mileage given by the tire built in 1910. Figuring on this basis, the 34 x 4 tire to-day gives three times the 1910 mileage and costs more than 40 per cent less.

W. O. Rutherford, vice-president of Goodrich, in charge of sales, in discussing the company's announced tire price reduction, states:

"I presume that the reduction in tire prices was not unexpected by the motoring public. But it is safe to say that it is a much greater reduction than the consumer anticipated. The only question is whether or not it is too low.

"Putting business on a normal basis is not a job for one man or one concern. The public can do this better than any other force, and it will find both manufacturers and dealers more than ready to co-operate. Conditions in the automobile industry seem to be much better, and the outlook much brighter, and of course this will be reflected in the tire industry. Fair wages, honest products, right prices and a square deal all around are what will give producer, distributor and public real confidence. Recognizing this, we put our prices at the point we have announced."

Mason Makes Price Cut

AKRON, May 2—Mason Tire & Rubber Co. has reduced the prices of heavy duty cord tires 20 per cent and other prices in proportion. Preferred and common stock of the Mason Rubber Plantation Co. will be acquired by the Mason Tire & Rubber Co. of Kent, according to notices being sent to all stockholders. The exchange will be made on the basis of preferred stock share for share plus the accumulated dividends to July 1, and one share of Mason Tire & Rubber series "B" no par common stock for two shares of Plantation common, fractional shares to be adjusted on the basis of \$20 per share for the Mason Tire & Rubber stock.

Goodyear Doubles March Sales

AKRON, May 2—Sales of the Goodyear Tire & Rubber Co. for April represented an increase of 125 per cent over March sales, with prospects bright for a continued increase in dealer and automobile manufacturers tire specifications

for May, officials announce. The company had anticipated a 75 per cent increase in April sales and, working on this basis, added 1200 men, increasing production to 17,000 tires a day. But with the steady pouring in of orders it was necessary to put on several thousand more men, to reinstate the third or midnight factory shift and to speed production to 20,000 tires a day.

Firestone on 20,000 a Day

AKRON, May 2—The Firestone Tire & Rubber Co. to-day advanced to a production of 20,000 tires a day, which is equal to the company's normal production of last year, and is above the Firestone pre-war production record. Firestone during April increased production from 10,000 to 15,000 tires a day, putting on several thousand employees.

Increased tire specifications from automobile manufacturers and heavy demand for tires from all dealers necessitate the big jump in production, officials state.

President Harvey S. Firestone announces, in connection with the re-employment of many men, that all employees of the company now are stockholders. As far as is known Firestone thus becomes the only large concern in the country with 100 per cent of its employees owning stock in the company.

Cotton Financing

Cuts Car Credits

(Continued from page 981)

While the cotton producers have not sold their cotton, both they and the bankers are working together on plans to sell it through cooperative methods, and by the aid of the Edge Bank in New Orleans, to the mills of Middle Europe. To do this the bankers have agreed to finance the cotton planters, but to do this financing they must have money, and the first man to fall under this search for money is the automobile distributor and dealer.

Before the automobile industry of the South can be put back on its feet firmly, there must be a break in this chain, so that fresh money can come in. The financing of the crops is now the vital issue in the territory around New Orleans, and while the automotive industry is a vital factor in the production and movement of those crops, it appears to be in the position of having to wait for a real revival of business until the crops are in and sold.

United States Cuts Price

NEW YORK, May 4—A general reduction in prices on tires has been made by the United States Rubber Co., which will become effective at once. The extent of the cut and its application to the different tire products is now being determined at the factory.

Pennsylvania Prices Down

JEANNETTE, PA., May 2—Pennsylvania Rubber Co. has reduced prices on all tires and tubes 20 per cent, effective today.

Commission Declines Rail Rate Change

Lower Charges on Shipments to
Intermediary Points Are
Refused

NEW YORK, May 4—In a decision of great importance to passenger car and motor truck manufacturers and to dealers on the Pacific Coast, the Interstate Commerce Commission has dismissed the complaint of the Intermediate Rate Association, which sought to require lower freight rates to intermediate points than to Pacific Coast points on shipments from the East.

This case is the latest development in the long debated question of how to adjust transcontinental rates so that railroads may fairly meet water competition. In this instance the carriers proposed an adjustment, one feature of which was to cancel the special (or so-called commodity rates) on passenger cars and motor trucks in carloads and apply on such shipments instead the class rates. This would also have increased the carload minima.

Carriers pointed particularly to the fact that class rates apply on such shipments generally in all other territories. The examiner condemned the class rates as too high for the long overland haul and suggested a scale that would have resulted in about the same rates on automobile shipments under class rates as now apply under the commodity rates, but these charges are not included in the final order.

The proposed readjustment would have affected Eastern shipping interests generally, and the case attracted wide attention and many protests. The proposed cancellation of automobile and truck rates became known through a report submitted by the railroads as to the commission about a year ago, as a basis for meeting the complaint of the Intermediate Rate Association. The National Automobile Chamber of Commerce at once intervened, engaged counsel, and with the assistance and co-operation of members and Pacific Coast dealers gathered data, submitted evidence at the hearing in New York, May 5, 1920, and final argument before the commission at Washington, Dec. 3, 1920.

The N. A. C. C. was able to show that no traffic, certainly none of like character, moves in as great quantity as motor cars; that in 1919 shipments amounted to 31,500 carloads, the total freight on which was \$15,000,000, and that the proposed rate adjustment would have added \$3,000,000 to this amount through increased freight charges.

RESERVE BANK LOWERS RATE

NEW YORK, MAY 5—The Federal Reserve Bank of New York announced yesterday a reduction in its rediscount rate on commercial paper from 7 per cent to 6½ per cent. The rate has been at 7 per cent since June 1, 1920.

Mellon Proposes New Motor Taxes

Believe Intelligent Tax Revision Will Encourage Production— Hearings Next Week

(Continued from page 976)

only hope of effective relief from the tax burden."

Emphasis was given to the fact that "an intelligent revision of these taxes should encourage production and in the long run increase rather than diminish revenues."

The Senate Finance Committee will open hearings on internal revenue revision next week. Witnesses will be asked to express their opinion of the proposed sales tax and other propositions, including the Treasury plan. The unmistakable hostility to a general sales tax, as revealed in the Mellon letter, will have a tendency to block the bill in Congress. It is understood that the Treasury would not speak without the consent of the President and the Chief Executive could not logically, at least, favor a proposal which his financial advisors had opposed.

The testimony taken at the Senate hearings will be forwarded to the House Committee on Ways and Means to save time. This departure will not detract from the importance of fiscal legislation originating in the House, but is adopted purely in the interests of expediency. It is quite likely that the tax committee of the N. A. C. C. will be among the first representatives of industry to be called.

Associations Prepare to Urge Tax Reform

NEW YORK, May 5—Presentation of its taxation program will be made before the Senate Finance Committee next Tuesday or Wednesday by the National Automobile Chamber of Commerce. The hearing has been granted earlier than had been expected and only a half hour will be given for presentation of motor vehicle manufacturers' arguments.

Charts will be used to illustrate to the Senators the heavy burden of taxation already borne by the industry and to demonstrate that additional imposts would be an injustice.

The taxation committee, headed by C. C. Hanch, is in session in Detroit in connection with the monthly meeting of directors of the organization and is working out in detail the plan for presentation to the committee. The arguments will be made by Roy D. Chapin and George N. Graham.

Recommendation of Secretary of the Treasury Mellon that a Federal license fee be imposed on automobiles as a means of providing additional revenue probably will result in a recasting of the N. A. C. C. argument. It has been contended that the industry now pays more than its share of taxes and it will

be argued that a further Federal tax would be distinctly unfair.

The National Automobile Dealers Association, through C. A. Vane, its general counsel, has been assured by the Senate Finance Committee that it will be granted a hearing on the excise tax provision of the present revenue law. The date for this hearing has not been set, but it will not be simultaneous with that of the N. A. C. C.

Directors of the Motor and Accessory Manufacturers Association in session here to-day will determine whether that branch of the industry will ask a special hearing on taxation.

Application for a hearing already has been made by the Rubber Association of America and its program will be similar to that of the N. A. C. C.

Townsend Bill Hearings to Begin Week of May 8

WASHINGTON, May 3—Arrangements have been made for hearings on the Townsend Highway bill beginning next week, before the Senate Committee on Postoffices and Post roads. Farmers' organizations and certain groups of highway officials have announced that they will fight the Townsend bill both in committee and on the floor. The fact that President Harding has approved the principles contained in the proposed measure, which was designed after his suggestions were received by Congress, is expected to have a great influence in securing favorable action in the Senate and House.

The American Association of Highway Officials has submitted another plan of highway legislation differing from the Townsend bill in that it does not call for Federal Highway Commission appropriations and adopts another formula of distribution of Federal funds. In other respects, every point contained in the highway organization's bill is carried in the Townsend measure, indicating that they will not have many strong points for argument against the bill. The Highway Commission's measure provides for distribution of at least 60 per cent of Federal funds for the development and maintenance of highways of inter-state importance and the balance on roads of State importance.

The Chamber of Commerce of the United States, at its annual meeting in Atlantic City last week, endorsed the principles contained in the Townsend bill, Senator Townsend expects to conclude the hearings and report the measure to the Senate before June 1.

MEXICO INCREASES TIRE DUTY

WASHINGTON, May 3—According to a cablegram from Consul Cornelius Ferris, Jr., Mexico City, under date of April 30, a decree promulgated April 19, effective April 23, increased the Mexican duty on rubber tires for automobiles from 1 peso (50c.) per gross kilo to 1.50 peso (75c.) per gross kilo of 2.2 pounds, and on rubber tires for motor trucks from .50 peso (25c.) to .75 peso (37½c.) per gross kilo.

Anti-Dumping Change Makes Mellon Judge

Senate Would Bestow Power Upon Treasury Head to Apply Special Duties

WASHINGTON, May 4—While no specific provision has been made to cover the reimportation of motor trucks or war supplies in the anti-dumping bill, Senate leaders believe that this unfair competition may be checked by imposing the dumping duties upon merchandise in cases in which the Secretary of the Treasury, after due investigation, has instructed the appraising officers to apply the anti-dumping provision.

The Senate to-day took up the consideration of the bill as reported by the Senate Finance Committee. This committee reported that it remains for the secretary to determine that the importation of dutiable or free foreign merchandise is injuring or is likely to injure an industry in this country, or is likely to be sold here or elsewhere at less than its fair value.

The situation is not entirely satisfactory to the automotive industry, which had been assured by Senator Smoot that no anti-dumping bill would be passed which did not specifically cover the reimportation of American made motor vehicles and equipment. The chief difficulty foreseen in connection with the bill as it now stands is the interpretation of what constitutes foreign merchandise. Whether American made goods sold abroad and then reimported into the United States by foreign purchasers could be placed in this category remains to be seen.

C. A. Vane, general counsel of the National Automobile Dealers Association, has asked for a hearing on the subject and will endeavor to have the bill so amended that there will be no loophole through which this automotive equipment can be slipped into the country and injure home industry.

American airplane manufacturers will seek the same protection, and the Manufacturers Aircraft Association also has asked for a hearing.

Must Equal Market Values

As the bill stands, a special dumping duty is provided in cases in which the Secretary determines that there is likely to be dumping. The duty imposed will be determined as follows:

"If the merchandise is sold by the foreign seller to an American purchaser having no interest in the business of the foreign seller, and the American purchaser purchases the merchandise at less than the foreign market value, the special dumping duty will be the difference between the foreign market value and the purchase price."

In case the merchandise is sold by a foreign seller having an interest in the American purchasing agency or by a

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Industry's Production \$3,594,814,620 in 1920

Exports Double Figures for Previous Year—Registrations Increase 22 Per Cent

NEW YORK, May 3—All records for the automotive industry were shattered in 1920. The remarkable showing made last year, notwithstanding the serious depression which came in the later months, is shown by statistics contained in the 1921 edition of "Facts and Figures," issued by the National Automobile Chamber of Commerce.

The total wholesale business in motor vehicles, parts, tires and accessories in 1920 amounted to \$3,594,814,620. This included car and truck sales of \$2,232,927,678, parts and accessories of more than \$725,000,000 and tire replacement business of \$636,750,000.

Many pages of the pamphlet are devoted to research supporting the statement of President Harding that "the motor car has become an indispensable instrument in our political, social and industrial life." It is shown that 3,000,000 motor vehicles are used by farmers, 100,000 by doctors, 30,000 by state governments, 10,000 by municipalities, 12,000 by rural schools, 4000 by packing companies.

Exports formed a larger part in the automobile business than ever, with 1920 having 7½ per cent of the total output, as compared with 4 per cent the year before. The total number of motor vehicles exported was 170,765, or more than double the 1919 figure of 82,652. The United Kingdom, British India, Canada and Cuba were the largest buyers.

The automobile to-day pays more special taxes than any other industry. Total levies upon the automobile in 1920 exceeded \$316,720,000. More than \$148,000,000 of this was in Federal taxes.

Enclosed bodies formed 17 per cent of the passenger car production as compared with 10 per cent in 1919.

Automobile registration in the United States in 1920 totaled 9,211,295, or 22 per cent more than 1919, according to the N. A. C. C. figures. Approximately 990,000 of these vehicles were motor trucks. South Dakota now has one automobile for every five persons. Iowa one for every five and a half, and Nebraska one for every 5.9.

Remarkable gains were made in the fuel supply during the year. Although threatened with a shortage in the spring, production was increased to a point where it reached 4,882,546,699 gal. of gasoline for the year, an excess of 626,118,674 gal. over the demand.

ITALY LIFTS TARIFF BAN

WASHINGTON, May 2—The Department of Commerce has been advised by the commercial attache at Rome that the Italian prohibition on the importation of American made passenger automobiles was removed April 19.

Outstanding Automobile Facts of 1920

Volume of Motor Vehicles, parts, tires and accessories, wholesale business		\$3,594,814,620
Value complete car and truck output		\$2,232,927,678
Value parts and accessories output		\$725,136,942
Value tire replacement output		\$636,750,000
MOTOR VEHICLES PRODUCED		2,205,197
Number cars		1,883,158
Number trucks		322,039
Per cent gain over 1919		12%
Per cent exported		7½%
REGISTRATION IN U. S. A.		9,211,295
Per cent gain over 1919		22%
Number automobiles on farms, approx.		3,000,000
MOTOR VEHICLE MANUFACTURING BUSINESS:		
Capital invested		\$1,204,378,642
Number of employees		325,000
Wages and salaries		\$482,950,000
TIRE AND FUEL FIGURES:		
Gasoline produced, gal.		4,882,546,699
Gasoline consumed, gal.		4,256,428,005
Tires produced		32,400,000

Exports of Automobiles, Airplanes, Trucks, Farm Tractors, Motorcycles and Parts for March and 8 Previous Months

	Month of March 1920		1921		9 Months Ending March 1920		1921	
	No.	Value	No.	Value	No.	Value	No.	Value
Airplanes			1	\$15,000	39	\$206,480	54	\$401,955
Airplane parts		\$159,783		10,921		381,543		143,444
Commercial cars	3,127	4,616,467	606	868,230	15,806	28,333,413	16,132	27,364,882
Motorcycles	4,285	1,164,049	859	291,599	24,099	6,597,843	22,769	7,154,087
Passenger cars	14,005	15,267,732	2,019	2,348,378	73,429	79,396,208	77,518	95,824,913
Parts, not including engines and tires		9,143,156		3,097,890		43,688,748		58,797,090

Engines

	Month of March 1920		1921		9 Months Ending March 1920		1921	
	No.	Value	No.	Value	No.	Value	No.	Value
Automobile, gas.	4,423	\$675,171	1,433	\$270,559	28,605	\$4,309,261	11,321	\$2,064,863
Marine, gas.	1,076	323,841	345	131,988	6,965	2,481,931	5,733	2,211,109
Stationary, gas.	2,508	527,876	759	121,745	19,983	2,935,009	21,085	4,132,178
Tractor, gas.	2,220	2,121,258	379	350,319	13,748	12,493,622	13,555	13,253,739
Total	10,227	\$3,648,146	2,616	\$874,611	69,301	\$22,219,823	51,694	\$21,661,889

Exports of Automobiles, Airplanes, Trucks, Farm Tractors, Motorcycles and Parts for February and 8 Previous Months

	Month of February 1920		1921		Eight Months Ending Feb. 1920		1921	
	No.	Value	No.	Value	No.	Value	No.	Value
Airplanes	3	\$44,000			39	\$206,480	53	\$386,955
Airplane Parts		6,494		24,213		221,760		132,523
Commercial Cars	2,894	4,161,494	1,120	1,952,736	12,679	23,716,946	15,526	26,496,652
Motorcycles	3,449	920,403	1,000	333,437	19,814	5,433,794	21,910	6,862,488
Passenger Cars	11,221	11,604,622	2,492	3,165,170	59,424	64,128,476	75,499	93,476,535
Parts, not including engines and tires ..		7,208,373		3,426,517		34,545,542		55,699,200

Engines

	Month of February 1920		1921		Eight Months Ending Feb. 1920		1921	
	No.	Value	No.	Value	No.	Value	No.	Value
Automobile, gas.	3,315	\$488,421	881	\$153,258	24,182	\$3,634,090	9,888	\$1,794,304
Marine, gas.	550	245,504	530	216,058	5,889	2,158,090	5,388	2,079,121
Stationary, gas.	1,913	310,151	951	326,398	17,475	2,407,133	20,626	4,010,433
Tractor, gas.	1,353	1,247,431	772	827,694	11,528	10,372,364	13,140	12,862,698
Total	7,131	2,291,507	3,134	1,523,408	59,074	18,571,677	49,042	20,740,556

Standard to Produce Steam Car and Truck

Company Is Organized in St. Louis to Build Vehicles Designed by Scott

ST. LOUIS, May 3—A manufacturing corporation to produce in St. Louis the steam vehicle designed during the past three years under the auspices of the Standard Engineering Co. has been formed under the name the Standard Steam Corp. A steam motor truck is added to the passenger car which was the first product designed by the company. All the assets of the company are taken over by the newly formed organization.

A number of prominent St. Louisans are interested in the corporation. The officers are: W. J. Parrish, formerly the Packard distributor in this city, president; Charles A. Lemp and L. L. Scott, vice-presidents; A. J. Lindsay, secretary and treasurer. The other directors are: Charles L. Holman, R. L. Hedges and J. L. Johnston. Among the stockholders are Russell E. Gardner, Jr., Benjamin Gratz, Anderson Gratz, John L. Moran, G. H. Walker, W. B. Dean, John H. Holliday, W. H. Bixby, W. K. Bixby, Fred W. Gardner, L. M. Rumsey, E. C. Stuart, Edward Beecher, Samuel Fordyce, John R. Carroll, H. D. Condie, Lewis B. Ely, Kurt V. Moll, Frank Wyman, W. H. Whitton and George B. Evans.

The chief interest centers in the steam motor truck which the corporation plans to produce, in view of the fact that it will be the first concern to manufacture this type of vehicle. L. L. Scott is designer of both the passenger car and the truck and has embodied many new principles in the new engine.

The Fifth Avenue Coach Co., which operates 300 motor buses in New York City, sent its general manager, G. A. Green, and two engineers to inspect and test the steam truck with a view of inaugurating the use of the steamers in their bus system. The final result of their investigations in this respect have not as yet been made known here.

Moline Plow Shows \$1,935,289 Deficit

MOLINE, ILL., April 30—The effect of the readjustment in the implement industry last year, heightened by a reorganization, is reflected in the annual report of the Moline Plow Co. For the year ended Dec. 31, 1920, the company showed an operating deficit, after charges, of \$1,320,289, and a total deficit, after preferred stock dividends, of \$1,935,289. For the fourteen months ended Dec. 31, 1919, the operating income was \$48,115, but after preferred dividends there was a deficit of \$720,635. The current report shows the surplus reduced to \$61,587, as compared with \$1,996,876 at the end of 1919, while the surplus Oct. 31, 1918, was \$2,717,511.

FEBRUARY SALES TOTAL 77 PER CENT OF 1920

NEW YORK, May 2—Additional evidence that the purchasing power of the United States has not been curtailed to such an extent as has been supposed, is found in the fact that total purchases of merchandise in February last averaged 77 per cent of the purchases for February, 1920, which probably was the largest February the merchants of the country ever had.

Statistics compiled by Roger Babson show that in the States of Arizona, Maine and Oklahoma the purchases in February, 1921, equaled or exceeded those in the same month the preceding year. States in which the percentage was 90 or over were Arkansas, California, Maryland, New Jersey, New Mexico, Pennsylvania and Texas.

States in which the percentage was more than 80 but less than 90 were: Connecticut, Delaware, Florida, Illinois, Indiana, Iowa, Louisiana, Mississippi, Nevada, New York, North Carolina, Ohio, Oregon, Utah, Virginia and Wisconsin.

States which had the lowest percentage were Colorado 63, Georgia 63, Idaho 64, Kansas 68, Tennessee 63, South Carolina 58, and Washington 65.

DUPONT INSPECTS UNITS

DETROIT, May 5—President DuPont, Vice-Presidents Sloan and Haskell and other heads of divisions of the General Motors Corp., are in Detroit this week inspecting the more important units of the corporation in this territory. The trip was made simultaneously with a regular meeting of the operations committee. Various questions of policy have been discussed but no announcement regarding them has been made.

CLARK MAKES NEW PISTON

LOS ANGELES, May 3—The Clark-Turner Piston Co. of this city has placed on the market an oversize piston which is cast on a special oversize core, so that the wall thickness is no greater than in the regular piston and the weight is only a fraction of an ounce greater. It is explained that most oversize pistons are cast exactly the same as the stock pistons, so the wall thickness is increased by one-half the oversize.

MIDLAND FORECLOSURE SOUGHT

OKLAHOMA CITY, May 2—A petition seeking foreclosure on property owned by the Midland Motor Co. of Oklahoma City has been filed in District Court by the Union Trust Co. of this city, alleging failure to pay interest on \$52,000 worth of bonds. Date for hearing the suit has not been set. The Midland plant has been leased to the Wichita Truck Mfg. Co.

METAL MARKETS

IN both the ferrous and non-ferrous metal markets there is evidence of a very modest broadening in the consuming demand. The tonnages involved in the orders actually placed, are, however, light. Invariably after the metal markets have been in the doldrums for a period of several months, the first orders that break the deadlock between sellers and buyers are grossly exaggerated. This time-honored, though none the less misleading practice is due to the inherent shortcomings of market reporting. A sheet producer has an inquiry for 5,000 tons of sheets from an automotive consumer. He tells the truth about it. So does his competitor who has the same inquiry. Still another sheet mill is asked to quote on the same tonnage by the same consumer. By the time the inquiry gets into the market reports, it is presented as 15,000 tons of sheets being asked for, when, in fact, the tonnage, on which figures were requested, was only 5,000 tons. It frequently happens that a consumer, when in need of 25 tons of aluminum, sends a form letter to a dozen brokers operating in the "outside" market. By the time all of the brokers have told this or that market reporter of this inquiry, the demand for aluminum appears imposing when, in truth, only 25 tons are wanted. Especially under prevailing conditions producers are not finding any fault with this optical delusion. It may help to quicken the momentum of demand. Steel producers figure, and probably correctly so, that news of the buying of impressive tonnages by one passenger car builder will beget orders from others. As stated at the outset, the consuming demand is expanding but expanding slowly and, on the whole, tonnages involved are still subnormal. There is more inquiry for sheets than for other steel products. All of this is admitted and even emphasized but reports conveying the impression as though sheet mills were once more unable to fill the many orders for immediate delivery which they are credited with having received in the last few weeks are utterly deceptive and fraught with harm. There has been no over-night change in conditions, in fact, some of the inquiries emanating from the automotive industries which are for deliveries spread over the second and third quarters are strictly tentative and were intended as an encouragement to the steel industry to hasten wage readjustment.

Pig Iron—A more steady tone prevails with buying by automotive foundries on a hand to mouth scale. Everything depends on downward revision of freight rates. The Studebaker Corporation, Detroit, is inquiring for about 500 tons of foundry iron for July delivery.

Steel—On the new price basis of 3.10c., Pittsburgh, automotive consumers are taking up what cold-finished steel bars they still have due on old contracts but fresh buying is seemingly in abeyance. Rumors are afloat that some business in sundry steel products is getting onto books of the smaller "independents" at below the "stabilized" price levels.

Aluminum—The general feeling in the aluminum trade is that quickening of the demand from the automotive industry is not very distant.

Copper—Large consumers are picking up odd lots when they can get them at bargain prices. In one quarter, curtailment of production, as the result of shut-down of mines is placed at only 50 per cent as against 75 per cent heretofore accepted.

FINANCIAL NOTES

Studebaker Corp. has reduced its bank loans to \$4,000,000. Production for the first quarter of the year as predetermined in January was at 50 per cent capacity. The company expects to make and sell 21,000 cars in the second quarter, which will break all records. Profits for the first quarter were \$2,110,577. The latest balance sheet shows inventories sharply reduced.

Rogers Auto Sweeper Co. has been incorporated with a capital of \$50,000 to manufacture automobile street sweepers. Howard C. Rogers was elected president and W. H. Duffy, secretary and treasurer. Duffy is director of public service of Columbus, while N. A. McCoy, one of the directors, is head of the Columbus street cleaning department.

Motor Products Corp. reports total assets to Dec. 31 as \$8,185,724, in which is included inventories totaling \$1,698,155 and cash of \$411,340. The surplus totals \$4,335,939.

Hess Mercury Carburetor Co., Valparaiso, Ind., has been made defendant in a bankruptcy action instituted by employees.

Bull Dog Tractor Co. has reorganized as the Bull Dog Tractor Corp. and the capital reduced from \$750,000 to \$250,000.

Perfection Tire & Rubber Co. will proceed with its recapitalization plans following ratification by stockholders.

Nash Motors Co. paid the regular quarterly preferred dividend of 1½ per cent on May 2.

INDUSTRIAL NOTES

Manley Mfg. Co. has taken over the inventory, dies, jigs, fixtures and patents of the J. B. S. Mfg. Co., Elmira, N. Y., manufacturers of the Ellis-Smith line of automotive equipment. The Manley company plans to continue the manufacture of the line practically in its entirety in this city.

H. P. Rhodes, formerly with the Howe Lamp & Mfg. Co. and the New Era Spring & Specialty Co., and T. F. McMurray, former manufacturer of Indianapolis, have formed a company at Fort Wayne, Ind., to act as manufacturers' sales agents.

Motor Wheel Corp., Lansing, Mich., has established a branch office at Detroit in charge of H. H. Crawford, who will represent the Gier Tuarc Steel Passenger Car Wheel in Michigan and Ohio.

Motch & Merryweather Machinery Co. of Cleveland has taken over the sales of the Gordon cam turning lathe, which is now being manufactured by the Willard Machine Tool Co. of Cincinnati.

W. D. Blood & Co., Inc., exporters and importers, New York, have opened a branch office in Boston for the exclusive purpose of looking after the trade in the New England States.

Sterling Tire Corp., Rutherford, N. J., has opened a western branch in Chicago. It has announced a policy of keeping its branch houses to as low a number as possible.

Hines Combine Harvester Co., Hutchinson, Kan., has adopted the Climax model "T" 5½ x 7-in. engine as standard power equipment for its combined harvesters.

Alvord Reamer & Tool Co. has opened a branch office in Chicago, where it will carry a complete stock of products. O. B. Cole is manager.

Automotive Gear Works, Atlanta, will establish a branch in Seattle to serve Pacific Coast points. H. M. Clark will be manager.

Gill Mfg. Co. has established branches at Spokane, Wash., and Houston, Texas., bringing the total of company branches to 41.

Lafayette Tractor & Machinery Co., Lafayette, Ind., will add three units to its plant to increase distribution and production.

Franklin Automobile Co. reports orders on April 28 for 885 cars for May delivery. Production for the month will aggregate 920 cars.

Pennsylvania Piston Ring Co., Inc., Cleveland, beginning with May 9, will run a full night shift in the production of piston rings.

Stewart-Warner Speedometer Corp. reports April sales as equalling those of the first three months of the year combined.

George H. Gibson Co., consulting engineers, has removed to the Hide & Leather Building, New York.

United Automotive Body Co., Cleveland, has acquired new plants at Streator, Ill., and Evansville, Ind.

Oakes Co., Indianapolis, has acquired the Toelle patent covering lock housings for screws and bolts.

Iron City Products Co., Pittsburgh, has changed its name to the Rees Mfg. Co.

Keystone Rubber Co. reports a \$500,000 loss by fire at the Erie, Pa., plant.

Spafford Co., Inc., Boston, has removed its offices to 10 Arlington Street.

Continental Piston Ring Co., Memphis, has moved into its new building.

Ford Reaches Schedule
of 4000 Cars Daily

DETROIT, May 3—Announcement is made by the Ford Motor Co. that production at its Highland Park plant has reached a schedule of 4000 cars a day, equaling the number produced at the peak last year. The force of workers is being increased daily and nearly 40,000 men are now reported employed. At the beginning of April the company had orders on hand for more than 200,000 cars.

GENERAL TRACTORS BANKRUPT

MADISON, WIS., May 4—General Tractors, Inc., a Delaware corporation with plants at Watertown, Wis.; Bramford, Ont., and Paulsboro, N. J., manufacturing the Monarch creeper type tractors, has been adjudicated a bankrupt. The referee is C. F. Lamb of this city. The last balance sheet of the company showed assets slightly in excess of \$2,000,000.

ARMY SALE NETS \$150,000

JEFFERSONVILLE, IND., May 2—Twenty-seven hundred trailers, two-wheeled, one-ton capacity, sold for an average of \$55 in lots of five in an auction at the quartermaster's depot here. Motorcycles and side cars in lots of ten sold for \$100.00, none in good condition. Passenger cars sold for \$60 to \$80. A total of 3500 motor transport units were sold for a total of \$150,000.

BANK CREDITS

Written exclusively for AUTOMOTIVE INDUSTRIES by the Guaranty Trust Co., second largest bank in America.

NEW YORK, May 5—Call money was again unchanged last week with a range off 6 per cent to 7 per cent and with a ruling rate not above 6½ per cent until Friday, when 7 per cent was quoted all day. The firmness of the week-end carried over until Monday of this week. Preparations for the month-end settlements and the report of the New York Associated Banks, showing reserves \$3,455,360 short of legal requirements, were factors partly responsible for the firmer rates toward the close of the week. There was little business done in the time money market. Nominal quotations for 90 days' to five months' paper were 6 per cent to 6½ per cent, while six months' paper commanded 6 per cent to 7 per cent. The previous week, 6½ per cent to 7 per cent was quoted for all maturities. Commercial paper rates receded in the latter part of the week to 7 per cent to 7½ per cent for 60 to 90 day indorsed bills and six months' paper with choice names.

In accordance with its new policy, the Federal Reserve Board published its weekly statement as at the close of business on Wednesday of last week instead of Friday, as heretofore. The System gained \$19,498,000 in gold reserves last week, while cash reserves increased \$11,959,000. Total bills on hand decreased \$50,960,000, and total earning assets \$55,580,000. Total deposits also declined \$23,452,000, and Federal Reserve notes in circulation \$26,580,000. As a result of these changes, the ratio of total reserves to deposit and Federal Reserve note liabilities combined increased from 54.1 per cent to 55. The ratio of gold reserves to Federal Reserve notes in circulation, after setting aside 35 per cent against deposit liabilities, increased from 65.8 per cent to 67.2 per cent. A corresponding gain was made by the New York Federal Reserve Bank.

The week was marked by several features of an unfavorable character. The Pennsylvania Railroad reduced its dividend from 6 per cent to 4 per cent—the lowest dividend paid by this road since 1891, while at least 6 per cent had been paid since 1900. The report of the Steel Corporation for the month of March revealed earnings smaller than for any month since April, 1915. Operations during the first few months were said to be at the rate of 90 per cent in January, 75 per cent in February, and 51 in March.

There were, nevertheless, signs of reviving confidence in many quarters. The stock market showed evidences of renewed interest by the public, with larger trading and rising prices, while the bond market absorbed a \$230,000,000 joint issue of the Great Northern and Northern Pacific Railroads, and at the same time the general list showed a stronger undertone with slightly advanced prices. The foreign exchange market showed a decided upward trend, Sterling reaching a new high point.

MEN OF THE INDUSTRY

Norton H. Van Sicklen has been elected president and general manager of the Reliance Wheel Co., manufacturer of a steel double disk wheel. The company is preparing to increase production and has under option a manufacturing plant equipped with the necessary machinery. Van Sicklen formerly headed the Van Sicklen Speedometer Mfg. Co., which was recently sold to the Stewart-Warner Corp. He is known to the iron and steel trade as a former official of the American Steel & Wire Co. J. M. Crenan is director of sales of the Reliance company and Charles T. Gaither, prominent member of the Youngstown Automobile Dealers Association, and president of the Youngstown Auto & Repair Co., is elected vice-president of the Reliance Wheel Co.

H. R. Hyman, advertising manager of the Cole Motor Car Co., of Indianapolis, will be one of the speakers at the annual convention in June of the Associated Advertising Clubs of the World. He will talk before the screen advertising department on "Merchandising Through Motion Pictures." The Cole company was one of the pioneers in the automotive field to use motion pictures for advertising purposes, through the production of "The Porcelain Lamp," a film that deals with the transportation problem from the first time wheels were invented down to the modern motor car.

L. F. Hosley, has been appointed production engineer of the Kelly-Springfield Motor Truck Co., Springfield, Ohio, and will be in charge of all production and assume responsibility for the quality of the product. Hosley was formerly assistant engineer of the Mercer Automobile Co. and prior to that was in the engineering department of the Locomobile Company.

Russell B. Reid, for several years with the Edward R. Ladew Co. as assistant sales manager, has been made manager of sales for the Sharon Pressed Steel Co., Sharon, Pa., manufacturer of motor car frames, industrial trucks and pressed steel automobile parts. Reid will direct the sales of the company from the New York office at 66 Broadway.

George E. Meurs has been appointed manager of the New York export branch of the Miller Rubber Co. He will be directly responsible to the Akron export department, which is in charge of C. E. Wagner. Meurs has had a varied export experience covering a period of thirteen years in Latin-America and New York City. He is succeeding Victor Roth.

J. J. Lowcher has resigned as credit manager of the Eisemann Magneto Corp. He has made no definite plans for the future. Lowcher went with the Eisemann company two years ago after his discharge from the army. He served seven years with the American Smelting & Refining Co. as traveling auditor and acting agent.

Alfred Reeves, general manager of the National Automobile Chamber of Commerce, completed his spring trip among the dealers with an address at Rochester. In his itinerary from Omaha to Boston he addressed 9000 dealers and bankers in the larger trade centers. Reeves will now turn his attention to tariff and taxation matters.

Stephen A. Howell, formerly in charge of the Chicago branch of A. Schrader's Son, Inc., has been promoted to the post of manager of the Schrader Toronto branch, succeeding Harold R. Cole, who is now at the main office of the company at Brooklyn.

Howell joined the Schrader company at Brooklyn in 1915.

Clifford Holder of Illinois has been appointed chief engineer for the North Carolina Highway Commission. Nine district engineers have been elected as follows: J. C. Gardner, R. E. Snowden, Will Morson, F. E. Schanpfe, John D. Waldrop, J. D. Pridgen, C. E. Currie, H. E. Noel and Wythe M. Peyton.

J. A. Benell, formerly assistant general manager for the Haynes Automobile Co., has been appointed district sales manager for California, Oregon, Idaho, Nevada, Washington and Arizona.

Howard K. Ford has resigned as manager of the Hastings Mfg. Co., Hastings, Mich., and has accepted a position as manager of the Winter Stamping Co., Goshen, Ind.

Harold E. Taylor, who was previously with the Gemco Mfg. Co., is now acting as sales manager for the Las-Stik Patch Mfg. Co., Hamilton, Ohio.

Blake Named President of Paragon Motors

CUMBERLAND, MD., May 2—Philip M. Blake of this city has been elected president and general manager as well as a director of the Paragon Motor Co., which has removed its plant here from Connellsville, Pa. The engineering department, which has been located at Cleveland, will be moved here at once and will be under the direction of P. F. Hackethal, the chief engineer. During the past year the engineering department has designed, built and tested four model Paragon cars. The Paragon engine is of four-cylinder design and has 12 valves operated by a single camshaft. Aluminum is used extensively in its manufacture.

Charles E. Barley, the sales manager, says that orders now on hand will consume a considerable portion of the first years production. The Paragon car will be produced in several body models built upon a standard chassis with a list price ranging between \$3000 and \$3500.

M.A.M.A. to Develop Membership Groups

NEW YORK, May 4—A new group plan of inter-organization is about to be established by the Motor and Accessory Manufacturers' Association. The plan will divide the membership of the association into a number of groups, each of which will comprise manufacturers of a certain product and each of which will have officers and meetings of its own.

The plan is designed to offer members of the association "an opportunity to meet with others in the same lines of manufacture, at periods as often as they themselves may determine, provided that not more than six consecutive months elapse between such meetings."

A detailed plan for the establishment and conduct of the new inter-organization has been approved by the Board of

Directors and General Manager Heminway of the association and has been submitted to members for approval. Many replies have been received from different parts of the country, all of which indorse the plan heartily. General Manager Heminway states that the plan is certain to go into effect and that it will undoubtedly make for greater unity.

Highway Traffic Body to Hold Open Sessions

NEW YORK, May 4—The annual meeting of the National Highway Traffic Association will be held at the Automobile Club of America, this city, on May 13. A dinner will be served at a nominal cover charge for which reservations should be sent to Secretary Elmer Thompson at the Automobile Club. The public has been invited to attend the dinner and also to take part in the discussions scheduled.

Addresses will be delivered by J. E. Pennybacker, secretary of the Asphalt Association, on "Relation of Methods of Financing Highway Improvements to Present and Future Traffic," and by Prof. Arthur H. Blanchard of the University of Michigan, on "Highway Improvements Should be Based on Transportation Surveys."

Annual reports of the officers and standing committees will be received and acted upon and officers will be elected for the year 1921 and 1922.

April Car Shipments 27 Per Cent Over March

NEW YORK, May 4—Figures compiled by the National Automobile Chamber of Commerce show that shipments of automobiles in April, exclusive of Fords, increased 27 per cent over March. Last year April decreased 23 per cent under March. Shipments from 50 factories indicate that the April total will be 20,000 carloads, 13,800 driveaways and 1134 shipped by boat. This is 71 per cent of the shipments in April, 1920.

While the railroads carried more automobile shipments in April of this year than last year, because of the lack of car supply and strikes, the difference in production is accounted for in driveaways.

WESTCOTT SHOWS MAY GAINS

SPRINGFIELD, OHIO, May 2—Shipments of automobiles from the plant of the Westcott Motor Car Co. during the month of April doubled that of any previous month since last fall, according to official announcement. "There has been a pleasing revival of business in almost every section of the country," said E. H. Gilcrist, sales manager. "While our business has shown a constant improvement since the first of the year we were hardly anticipating such an increase in April. Our advance orders now on hand for May delivery indicate a larger number of shipments for the next month, although the proportionate gain will not be so large."

Calendar

SHOWS

Sept. 28-Oct. 8—New York, Electrical Exposition, 71st Regt. Armory, Electric Equipment, Machinery and Vehicles.
Nov. 27-Dec. 3—New York, Automobile Salon, Hotel Commodore.
January—Chicago, Automobile Salon, Hotel Drake.

FOREIGN SHOWS

May 28, 1921—Czecho-Slovak International Automobile Exposition of Cars, Trucks, Tractors, Motorcycles and Equipment, Prague.
May 28-June 8—International Automobile Exhibition, Basle, Switzerland.
June, 1921—Reykjavik, Iceland, Agricultural Exhibition—Agricultural Machinery—

Icelandic Agricultural Society, Reykjavik, Iceland.

September—Buenos Aires, Argentina, Passenger Cars and Equipment, La Pabellon de las Rosas, Automovil Club Argentino.

September—Buenos Aires, Argentina, Cars, Trucks, Tractors, Farm Lighting Plants and Power Farming Machinery, Palermo Park; Sociedad Rural Argentina.

September—Luxemburg, Luxemburg, Agricultural Sample Exhibition.

Oct. 5-16—Paris, France, Paris Motor Show, Grand Palais, Administration de l'Exposition Internationale de l'Automobile, 51, Rue Pergolèse, Paris.

Nov. 4-12—London, British Motor Show, Society Motor Mfrs. and Traders.

CONVENTIONS

May 17-19—Buffalo, Convention of Factory Service Managers, Auspices of Service Committee, N.A.C.C.

May 23-26—Chicago, A.S.M.E. Spring Meeting, Congress Hotel.

May 24-28—West Baden, Ind., Summer Meeting Society of Automotive Engineers, West Baden Springs Hotel.

June 20-25—Mackinac Island, Mich., Summer Meeting Automobile Equipment Association.

Oct. 12-14, 1921—Chicago, Twenty-eighth Annual Convention National Implement & Vehicle Assn.

RACES

May 31—Indianapolis, International Sweepstakes.

June 3-5—Reno, Nev., First Annual Nevada Highway Road Race.

June 18—Uniontown, Pa., Speedway Events.

July 25—Grand Prix, Le Mans.
Labor Day—Uniontown, Pa., Autumn Classic.

S. A. E. MEETINGS

Metropolitan Section—May 3, Car Theft.

Midwest Section—May 13, Smoker, Dinner and Entertainment at Chicago Automobile Club.

Dayton Section—May 17, H. L. Horning.

Cleveland Section—May 20.

Anti-Dumping Change Makes Mellon Judge

(Continued from page 985)

foreign seller in which the American purchasing agency has an interest, at a price below foreign market value, the special dumping duty will be the difference between the foreign market value and the exporter's sales price.

If there is no foreign market value the special dumping duty will be the difference between the cost of production and the purchase price. It is believed that it will seldom be necessary to use this method except in cases in which the article is only sold for exportation to this country.

There has been much debate as to what constitutes the export value of these American trucks, sold abroad and reshipped by foreigners to American markets. The Senate has defined the term "export value" to be the price at the time of exportation to this country at which the article or similar article is sold or freely offered for sale for exportation to the United States to all purchasers in the principal markets of the country from which exported.

Truckmen "Hope for Action"

DETROIT, May 4—The motor truck committee of the National Automobile Chamber of Commerce spent some time here to-day discussing the anti-dumping bill now before Congress, and hope was expressed that action would be taken to protect the industry against the reimportation evil.

Most of the time at the meeting was devoted to a general discussion of conditions. A report on legislation was read and it was said that with only six state legislatures still in session only ten states have failed to adopt legislation providing that 800 lb. per inch of tire shall constitute a standard motor truck load.

Plans were formulated for promoting store door delivery by motor truck, and representations on this subject will be made to the Interstate Commerce Com-

mission. It is hoped to obtain the co-operation of railroads in having short haul business turned over to motor trucks.

The highway committee of the N. A. C. C. at a meeting yesterday discussed the redraft of the Townsend highway measure now pending before Congress. Roy D. Chapin and George M. Graham were delegated to go to Washington to appear before the committee, probably next week. The committee approved the principles of the Townsend bill as it has been redrafted.

Maxwell Stockholder to File Amended Suit

WILMINGTON, DEL., May 3—Permission to file an amended bill of complaint against the Maxwell Motor Co., a Delaware corporation with its principal factory in Detroit, designed primarily to stop the sale of the assets to a new corporation which was formed to take over the Maxwell and Chalmers companies, has been granted Holmes Jones of this city, a Maxwell stockholder, by Chancellor Curtis. Jones alleges that through "reckless waste and dissipation" the Maxwell Motor Co. lost \$25,933,194 in sixteen months.

Jones filed a bill of complaint with the court of chancery on Dec. 11 last, asking for the appointment of a receiver for the Maxwell company on the ground of insolvency. Application was made for demurrer, and while this was pending Jones asked permission to amend his complaint. Meanwhile the United States courts at Detroit, Indianapolis and Columbus granted friendly applications for a receivership under which President W. Ledyard Mitchell will take over the affairs of the Maxwell company.

BUS LINES SUPPLANT TRAINS

ALBANY, GA., May 2—Automobile buses are fast supplanting passenger trains as carriers in the southern half of Georgia. The buses are meeting with unusual success.

Corsican Grand Prix Won by Bignan-Sport

PARIS, April 23 (By Mail)—Albert Guyot, driving a special 183 cu. in. Bignan-Sport, won the Corsican Grand Prix yesterday, covering the distance of 274½ miles in 6 hours 7 min. 51 2/5 sec., or at an average of 45 m.p.h. This race was the first ever held on the island of Corsica, and was limited to cars having a piston displacement of not more than 183 cu. in. with four-passenger bodies of given dimensions, with fenders, windscreen and touring equipment. A cash prize of \$20,000 was awarded the winner.

Only nine cars were entered, these being 2 Bignan-Sport, 4 Turcat Méry, and 3 Chanard-Walcker. Three laps of a most difficult and varied course had to be covered, the road varying from a 30 mile dead level stretch by the side of the sea to a wild climb over the mountains where the rough surface made fast going impossible.

Guyot took the lead on the first lap and held it throughout the race. During the initial lap he was closely followed by his team-mate, Nougé, but this car dropped out on the second lap, and the running was taken up by Dauvergne on a Chanard-Walcker, and then by Rougier on a Turcat-Méry, who finished second, 35 minutes behind the winner.

FORM AIR PILOT ASSOCIATION

TORONTO, April 29—During the winter months there has quietly come into existence an organization, named the Commercial Air Pilots' Association of Canada, which has for its aim the elevation of aviation standards in general, and the best interests of the flying man and his employer in particular. The intention of the association is to link together the commercial pilots of the country as a united body, who, in working for the advancement of aviation, will benefit themselves at the same time. The association will keep on file all the latest and up-to-date information on aircraft and other details.